MARCH 1964

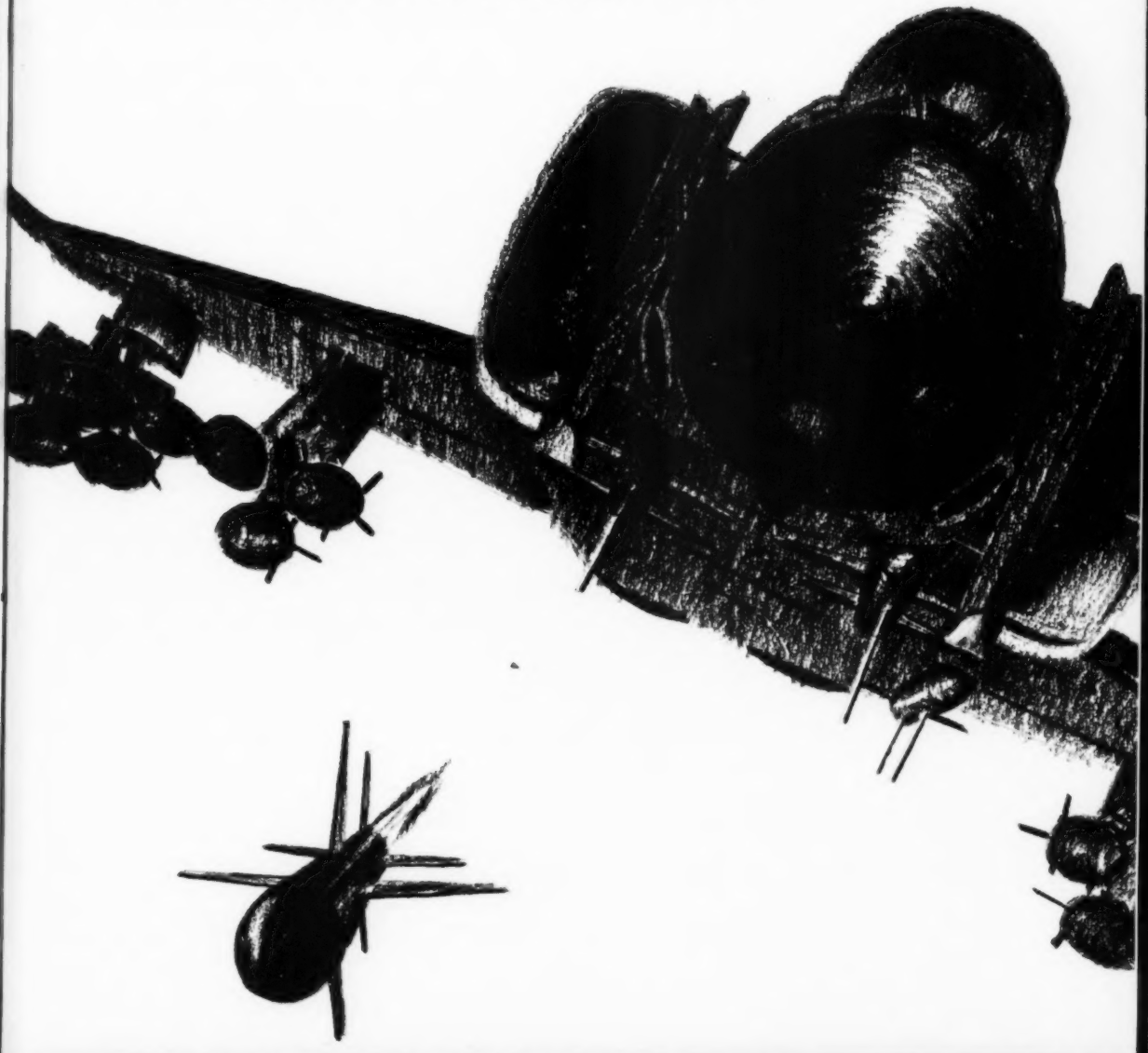
approach

THE NAVAL AVIATION SAFETY REVIEW

Decision to DIVERT!

Racers and Research, a golden era

How to prevent spark plug fouling



Captain F. H. Michaelis, USN, Commanding Officer, USS Enterprize (CVA(N)-65) graciously consented to dramatize the important command element of a divert situation.

THERE WILL PROBABLY COME A TIME IN EVERY CARRIER AVIATOR'S CAREER WHEN A SITUATION ARISES THAT WILL NOT PERMIT HIS RETURN TO THAT EVERLOVIN' PITCHING DECK.

Your Signal, DIVERT

By LT G. W. Lubbers, USN

1

The very mention of divert triggers many a memory and more often than not the ensuing tale is one of hair, adrenalin, and too often — tragedy. As an example, take the case of an A-3 and crew which were lost in the Med.

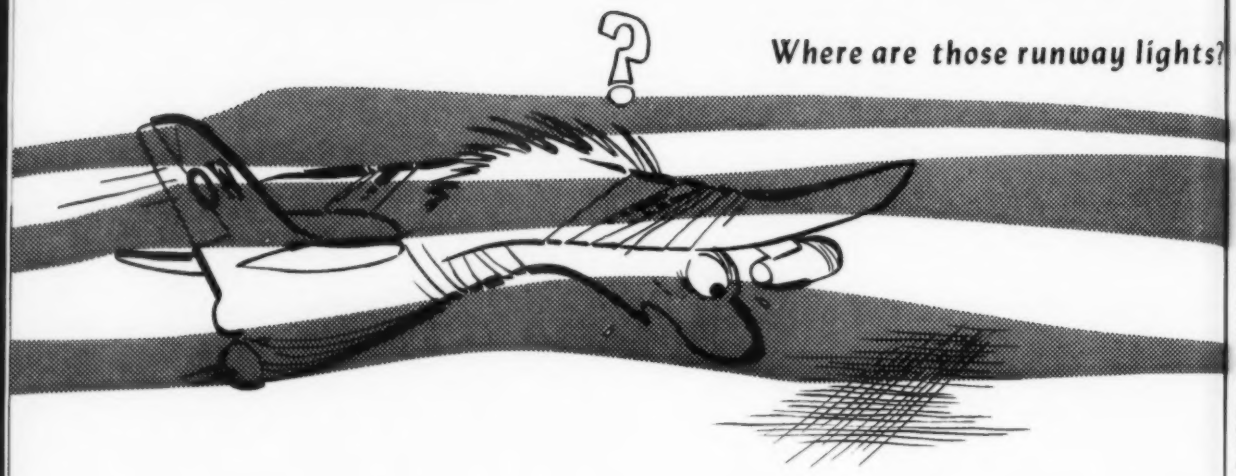
The pilot, bombardier and third crewman were briefed at 1430 for a 1530 launch. During the brief it was pointed out by returning pilots that the weather was not favorable as reported by the aerology office and appeared to be deteriorating in the ship's general operating area. At the time of the brief the divert field facilities and weather were covered. The pilot had filed an IFR flight plan direct to the target and return.

Subsequent to a normal preflight and on-deck check, including VHF and UHF radio checks, the plane was launched and proceeded according to flight plan. Five runs were made on the bomb site and the scores were of such a nature as to indicate that his radar was operating normally.

At 1630, because of deteriorating weather, it was decided to cancel night flying and a general recall was issued by the ship. Efforts were made, to no avail, to contact the A-3 and have him return prior to his normal scheduled recovery time of 1830.

The pilot made his final RBS run at 1722 and checked in with Center at 1815, 30 miles out at 30,000 feet. Since this was the only aircraft airborne he was cleared to descend. After this controlled descent he was turned over to the final controller for his first approach which was made at 1835. At this time the weather at the ship was reported as an estimated 1500 feet broken, 3000 feet overcast with five miles visibility in light rain.

On the first approach a state of 6.7 at 10 miles was reported which would have put him at the ramp at an approximate fuel state of 6.5. The Air Officer elected to trap him 500 pounds over max gross because of the poor weather conditions prevailing. The first approach resulted in a wave-



off due to being fast.

After executing his first waveoff, the pilot mentioned that he was unable to see the ball because of moisture on the windshield and because of failure of his windshield wipers. Five more passes were attempted resulting in three bolters and two waveoffs. The pilot mentioned poor visibility after passes three through six. Lineup appeared to be giving him difficulty and in the majority of passes wing positioning was erratic to violent, giving the impression that lineup determination was extremely difficult.

Divert Imminent

At the 180-degree position on his sixth and last approach he reported a state of 4.5. Divert fuel was computed at 4450 pounds leaving a reserve of 3000 pounds over the field. It was decided to let him attempt one more approach. At 1900, after a bolter pass, the pilot was told to clean up and steer 129 degrees, 63 miles for the divert field. He was instructed to climb to 15,000 feet, the optimum altitude, and maintain an indicated speed of .54. Shortly thereafter pertinent information was given on runway lengths, tower frequences, lighting and navigational aids and associated frequencies. He was informed that field weather was 4600 feet broken, 10 miles visibility in light rain.

When 33 miles from the field, instructions were given to commence descent. The pilot reported being unable to receive any navigational aids or to establish communications with the tower. He reported seeing something (*garbled transmission*) on the ground and shortly thereafter he reported his altitude as "one five" by which it is assumed he meant 1500 feet. An attempt was made at 1920 to alert the divert field via a Single Side Band Circuit but was unsuccessful due to the circuit being down.

Center held the aircraft intermittently on radar and, after initially tracking him over the estimated field position, he disappeared, then reappeared 20 miles northeast of the estimated position. The pilot was vectored 210 degrees, 20 miles in an attempt to re-position him over the field.

Lost — One A-3

At 1926 two way radio communications were lost. The A-3 was held intermittently on radar, both by "skin paint" and IFF return until 1953 at which time the last IFF return was noted on the radar.

At first light the following day the ship launched search aircraft for an overwater search and foreign aircraft searched land areas. Local police and fishermen were alerted. All searches were

A Skywarrior and three-lost.

completely negative.

Five days later two men in a small boat recovered a helmet floating near the coast and the next day another helmet was found on the beach. Subsequently, two other items from the aircraft were found which led to the conclusion – lost at sea.

In this accident the major cause factor seems to be the unavailable divert field. The field had been secured. However, many cause factors accompany the major one, the elimination of any one of which could well have changed the tragic ending to the flight. Had the weather been better, had the A-3 had an operative windshield rain removal system, had the pilot received the recall, had bail-out been ordered early enough or had ejection seats been available very possibly the crew would be alive today.

The accident board made several choice recommendations:

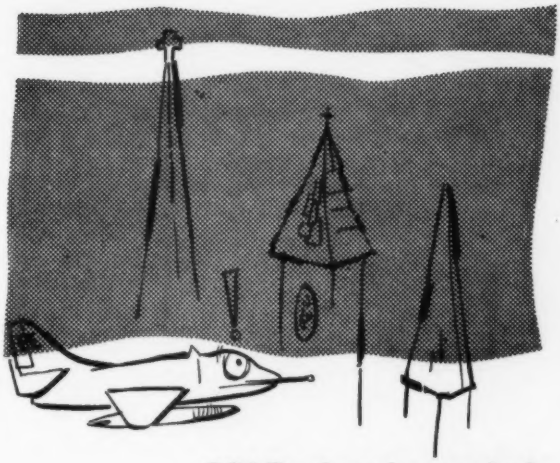
- A system be established whereby operating carriers receive positive confirmation of divert field status and availability. Rainmaker flights are not considered adequate for this purpose.
- The feasibility of an improved windshield rain removal system be investigated.
- Divert fields, which have limited capabilities, due to equipment shortages or language barriers, be manned during periods of scheduled alert by aircontrol teams equipped with UHF equipment.

It's the Little Things . . .

Most often, divert disasters can be attributed to some small seemingly insignificant error or malfunction which snowballs into a serious situation. In this instance it was a faulty windshield wiper.

In another case full of anxiety and adrenalin, a grease pencil played the culprit. An erroneous weather report placed on a status board in Air Ops prompted the decision to divert four A-4s. Posted weather was 1000 feet overcast 2 miles, actual field weather was 200 over one quarter to a half mile visibility. The divert field was a WWII fighter and patrol plane base which was built to take advantage of the natural camouflage of the terrain. In their search for the landing strip one of the pilots reported, "Ceilings were such that at times we were below the level of church steeples."

Three of the four pilots, upon reaching a critically low fuel state, broke off their search for the field, climbed on top of the overcast and



EGAD, church steeples!

ejected. The fourth pilot, having a little more fuel, decided to make one more try at the field. Shortly after passing the tacan he received two transmissions attempting to guide him to the field. The runway was spotted at his 2:00 o'clock and after a couple of steep turns he was lined up. A safe landing was made with 250 pounds showing on the fuel gage.

One of the pilots who ejected landed in the trees, the other two got wet. One of these was picked up by a small boat soon after touchdown, the other spent the night in his PK-2 which is, in itself, an interesting tale.

The air wing commander said, "This series of accidents should serve as a stark reminder to all personnel in any way connected with aviation or aviation support, that any operation is only as safe and effective as the collective efforts of each individual involved, whether this individual be the staff planner, or the man transcribing divert field weather on a status board. Sometimes, errors or omissions, which are never acceptable, can be and are made without adverse effects. In this case, an unfortunate series of oversights and errors, coupled with poor weather occurred in such a sequence as to destroy three aircraft and a house, injure three foreign nationals, and endanger four pilots and countless more foreign nationals. The saying 'A chain is only as strong as its weakest link' was never more appropriate than in the present case."

Ironically, the recommendations of this investigating board were similar to the ones made by the board investigating the A-3 accident. The sad part is, both mishaps occurred in the

same area of the globe but nine months apart. WHERE WAS THE CORRECTIVE ACTION?

Divert — A Serious Problem

Aircraft and pilots, lost during divert situations, continue to drain the Navy's resources and combat readiness. This problem is a serious one. If we accept the fact that diverts will occasionally occur then we must examine and solve the problems that exist.

In analyzing the divert problem, two basic questions need to be answered. Is diversion a logical, feasible solution to a sticky situation and if so, what has to be done to make it a routine rather than emergency operation?

Many pilots say the knowledge of a suitable divert field lends confidence and reassurance to carrier operations. I wonder if this isn't false security? Usually the signal to divert is given after two or three passes have been attempted and most often only after bingo fuel has been reached.

With only a bare minimum of fuel to make some point on the map, a pilot must leave his familiar environment, fly a good ways over water and safely land his thirsty bird in an unfamiliar environment. This is a good feat even under optimum weather conditions with ample nav aids and satisfactory communications.

Field Incompatability

At present we find that many of the divert fields and the majority of embarked aircraft are not compatible. In most areas the situation is generally one of a single runway of acceptable but not preferred length. The possibility of a cross-wind is good. Navigation aids and communications are often unreliable or non-existent, a language barrier, and mountainous terrain can add to the problems. Weather and darkness are probable and frequently the pilot has not landed on a runway in several months. In most cases pilot performance will be affected by the emergency situation that caused the divert. Throw in the fact that the pilot is now, more than before, sweating a low fuel state and you introduce a psychological factor that sometimes deters sound judgment. (In aviation jargon this is known as a substantial pucker factor.) When most of these factors occur simultaneously the probability of an accident at or near the divert field is very high.

On the other hand, many aviators opine that a carrier would be expected to recover its aircraft under adverse weather conditions in time of war so why not expect them to operate the same now. They reason that diversion is an unrealistic element to introduce in a fleet pilot's training and instead we should more strongly emphasize and practice proper carrier approach and landing techniques under all conditions. Although the philosophy of the use of divert fields can be argued both ways, its use is clearly indicated in order to avoid the unnecessary and unacceptable loss of an airplane.

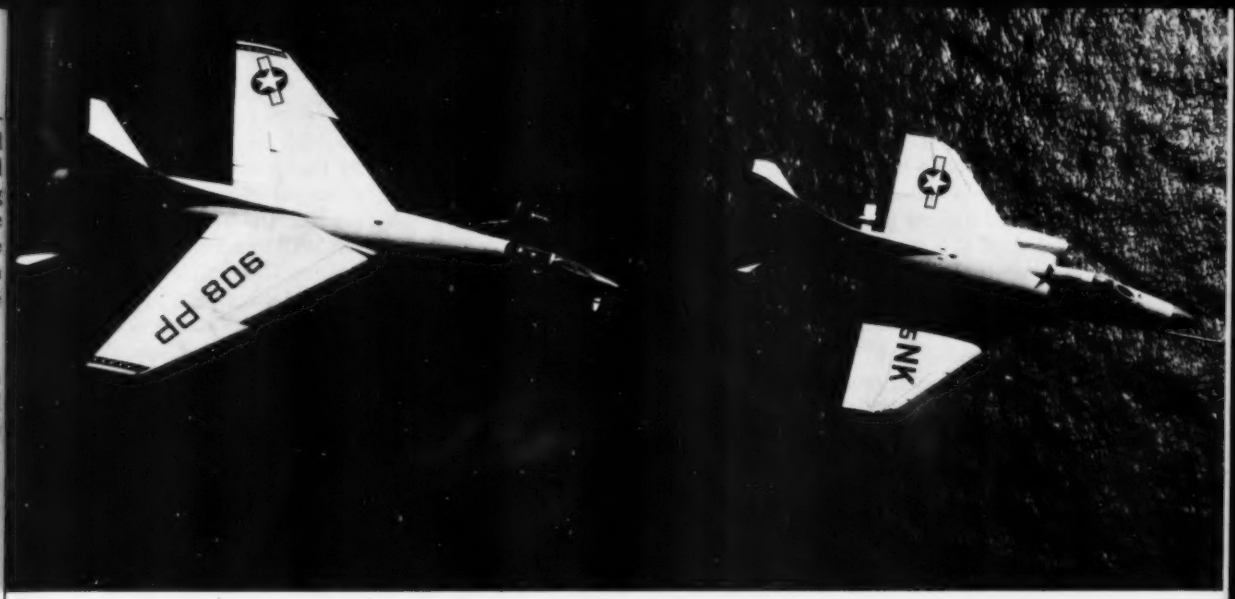
What Must Be Done?

First of all, it's only logical to make sure you have some place to divert to and that the field knows and is prepared to accept the traffic. The selecting of divert fields is a planning/support function that must be provided to a squadron pilot by higher authority. Proper liaison follow-up would have corrected many of the problems present at the time the pilots in the previously related accidents were attempting to land. Proper liaison should include an acknowledgment received from the field authorities that their field will be made available.

After initial liaison has been completed, carriers desiring to use the field should endeavor to establish direct voice or CW communications between the field and ship. It might be said that you are treading on thin ice if the only attempt to notify the field of its possible use is a message sent. The obligation doesn't end here! *An acknowledgment should be requested and received* or a sticky situation may be compounded rather than simplified by divert.

Adequate information about the field is another important item which must be provided the squadron pilot. Navigation/communication facilities, runway information and an up-to-date approach plate, if one is available, should be considered the bare minimum. *Photographs of the field and surrounding area, preferably from varying heights and angles, are a big help, especially if the nav gear is unusable.* When feasible, a flight check of divert field communication and navigation facilities should be made.

Several accident investigating boards have recommended that a small party be sent ashore with portable navigation and communication equipment to enhance the safety of a divert situation. The cost of positioning portable equipment with English speaking personnel on the field would appear to be warranted when considered in the light of losing an expensive aircraft. This would also alleviate, somewhat, the question of field status that is so often the case.



When possible, take on additional fuel. It may come in handy.

Although it is generally felt that such action would aid the situation, the added diplomatic and logistic problems created may render this recommendation infeasible in many cases.

However, modifying this proposal slightly by stationing an aircraft in the vicinity of or on the field to provide vital communications and UHF/ADF homing capabilities does seem feasible. On many ships the A-3 is regularly used to provide a communications relay via VHF, where this is the only tower communications available. As the A-5 replaces these airplanes in the fleet, this capability will be lost, however.

The Decision

Making the decision to divert an aircraft to a strange airfield, particularly at night, is always difficult and must be weighed very carefully against the chances of a successful recovery. While operational commitments may preclude the feasibility of implementing all of these recommendations, it is believed that the suitability of divert fields as well as divert policies should be subjected to close scrutiny when planning peace time operations – safety of the crew being paramount.

Since it is the pilot who is ultimately the key man in a divert situation, let's examine his viewpoint.

Just the normal tempo of aircraft recoveries is apt to be hectic. But when an abnormality occurs the pace increases to frantic. The deck has to be cleared, communications straightened out and the captain kept informed. But what about the pilots still airborne. The only info they receive is "Dog and conserve."

As you well know, the pilot is in a precarious situation. Fuel is generally low, his posterior is getting numb, and his bladder is about to bust. This guy is looking for a place to land. Don't keep him hanging. Too often requests for instructions or information are answered with "Roger, wait one." After "One" has been waited and still no word, it is easy to succumb to that feeling that nobody cares to share your problems. *Just a brief statement on the ship's conditions, a request for fuel state or position will do wonders to ease the tension.*

Time becomes priceless at this point too, because time is measured in pounds of JP pouring through the engine. Every minute of delay in making the big decision immeasurably increases the pucker factor and decreases chances for a successful landing. One case on record reveals an instance in which two pilots were diverted with slightly less than bingo fuel. One flamed out short of the field and ejected, the other made a precautionary flameout approach and landed safely. It might be said that these guys were placed on a limb, given a saw and told to cut – on the tree side.

Pilots Action

In the final analysis, though, it is the pilot's actions that make or break a successful divert situation. Another A-3 was lost because the pilot, with no previous jet experience, failed to fly the

proper profile to his divert field. The aircraft had suffered throttle linkage disconnect which placed one engine at idle. The divert field was 288 miles away and instead of climbing to altitude the pilot leveled off at 5000 feet. Four thousand pounds per hour of fuel flow through the good engine soon exhausted an ample supply and the crew bailed out short of their destination. The third crewman, as well as a costly aircraft, was lost.

There may be numerous circumstances and problems to cope with and solve but the primary concern of a pilot when given the divert signal should be, "How far do I have to go and what is my best combination of altitude, power and airspeed to get me there with the most fuel reserve." This comes under the heading of 'Bingo' information and should be one of the items thoroughly covered in the preflight briefing. Many squadrons produce for their pilots a knee board card telling the best profile for a given fuel weight and distance. This gouge is generally figured to give sufficient reserve but is usually based on normal aircraft operating efficiency. Should the aircraft sustain a casualty which would not permit normal flight, these bingo figures would not apply. Under such circumstances it helps to be proficient with the E6B.

The next problem a pilot faces is navigating to the divert strip. A radar plot and following is a big help from the ship but only if the ship is where it is thought to be. Radar should at least get you in the general vicinity but there is nothing like a good positive tacan or ADF lock on from the field. When you're not blessed with such accommodations, you'd better hope you're up on map reading because the only method left is that and the Mark I, mod O eyeball.

If the field has UHF communication gear but not nav aids, try getting the tower operator to give you a long count then use your AN/ARA 25. This brings to mind another hairy divert tale, this one with a happy ending.

The ship diverted a flight of two A-4s, one F-6, and one F-8 to a field having only VHF navigation and communication facilities. They were placed in the general vicinity via radar but the ground was hidden by an undercast. Three of the pilots blindly penetrated the cloud layer, eventually found the field and landed. The fourth, playing it according to Hoyle, ICAO and the like, looked for a hole to let down through. One was found but once underneath he became lost, and with less than 800 lbs. of fuel. Figuring to be north of the field the pilot took up a southerly heading along a coastal mountain range. It was necessary to fly beneath the tops of the mountains to maintain VMC (VFR) and this seriously hampered communications. The pilot was comtemplating ejection as the fuel gage read 500 lbs., when the AN/ARA 25 locked onto a long count broadcast from one of the heads up pilots already on deck. Navigating on the number one needle, the field was found and a safe landing was accomplished. The pilot shut down with less than 200 pounds indicated, let go of the seat cushion and dismounted.

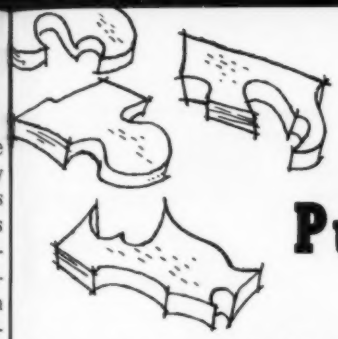
Unfortunately, the divert problem isn't over once you've found the field. That all important landing is yet to be made. Many would-be happy endings are changed at this point. Keep in mind four vital things as you turn the 180.

- The tires are carrying more pressure and will most likely blow if you plant them on too hard. This precipitates poor directional control and may cause you to exit the runway in an unorthodox manner.
- The throttle should come to idle, not 100 percent, as you've become accustomed to aboard ship. It doesn't take long for a bird developing MRT to cover five or six thousand feet of divert field.
- You have no purchase cable to bring you to a halt so get on the binders. As with the throttle, this is something out of the routine so concentrate on good braking techniques.
- The fourth item, almost too ridiculous to mention, is the tail hook. Make sure it's up. Several birds have been mortally wounded by snagging abort gear from the wrong direction.

Conclusion

In conclusion let me reiterate. Divert situations do present a problem and their misfortunes definitely contribute to the Navy's accident rate. It is an accident area however, that can be readily decreased by a little more foresight, planning, and most of all, *attention to details in advance at all levels of responsibility.*

There is no simple formula by which one can guarantee 100 percent success. Each situation will be different and require action accordingly. However, the basic problems can be stereotyped by the *use of sound, professional procedures coupled with constant, close supervision.*



Puzzle for P2E Pilots

Every story concerning landing or stopping distances brings up the inefficiency of skidding tires or locked brakes.

What stopping distance would you calculate for a P-2E which made a no-flap landing with brakes locked on touchdown?

An incident which occurred several years ago gives some actual figures for this situation. The puzzle comes from trying to figure out the stopping distance with optimum braking. In theory the distance should be less than with locked brakes.

Here are the conditions for the *locked brake* landing. A 10-man crew had been out for 2.2 hours on a fam and training hop. Field elevation is approximately sea level and temperature is 75-80 degrees F. There is a 10-knot headwind down the active runway. Weight is approximately 64,000 pounds and jets are off.

The pilot was simulating loss of the main system hydraulic pressure which would prevent the use of wing flaps and the main braking system. The emergency brake system was actuated several times just prior to landing; the brake lever returned to OFF position. Later, however, several minute metal particles were found in the emergency hydraulic reservoir filter and one larger particle was found in the brake pressure port which apparently prevented the spool in the emergency valve from actually moving to the OFF position. So the touchdown was made with brake pressure on, wheels locked.

Approach airspeed and altitude were good with touchdown approximately 1000 feet from the threshold. Emergency brake lever was kept in the full forward or OFF position but immediately after touchdown the feel and sound of blown tires was experienced. Reverse pitch was used to slow the aircraft. Rudder pressure and nose wheel steering were used for directional control.

The aircraft skidded in a relatively straight path for a ground run of 2350 feet, stopping 3200 feet from the threshold. Fire in both wheel assemblies was promptly extinguished by the crash crew.

Now, from the flight manual, try to figure the ground roll with: Flaps up, reverse pitch, and optimum braking (go ahead and assume braking effectiveness which would be obtained if main braking system were used). Send your calculations to APPROACH if you like and we'll print the majority opinion.

8

THE ETERNAL QUESTION

It is a popular pastime for engineers and designers to tout the advantages of their brain children in terms of pure performance; it will go so fast, fly so high, has umpteen pounds of firepower, and so forth.

All this is important to the pilots but it might be interesting to the drawing board boys to know that pilots throw in another factor when it comes to evaluating an airplane – "where in #$%&( )*@¢ do I stow my personal baggage?"

The open flames around the TFX cauldron have died down slightly so maybe we can just mention it without getting burned, though the pot is still pretty hot. Whatever its size, speed, and range, we'd bet a parachute bag against a toothbrush that the first pilot who ferries one from the factory will have to add a chapter to the flight manual. "Where in #$% ( )*@¢ do I stow my personnel baggage?"

There is no hint of this problem in Captain Gagle's otherwise detailed "Naval Aviator's Guide" and if you are lucky the old hands will check you out on

where to put stuff. Lacking that, it's a trial by error.

Now don't throw the problem in the designer's lap without giving him some leeway. Requirements for black boxes keep him busy trying to fit machinery into odd nooks and crannies. If forced to include baggage space he will just have to double up the duties of a compartment and add another identification arrangement drawing, such as: "Baggage/Radar compartment" or "Baggage/Fuel Control area." And you know who wins that round.

There are no known aircraft losses or fatalities due to misplaced baggage, but a few incidents and hairy tales have resulted.

Everybody now knows, or should know, not to hang suitbags over the inverters in the T-33 nose compartment. The nosewheel retraction setup in the F-9 could be jammed by loose gear in the nose, leaving you with a nosewheel-up landing. Even gear in the cockpit can cause embarrassment. After starting an F-8 the pilot placed helmet and oxygen mask bags on the aft left console; the speed brake override switch was apparently inadvertently actuated during the stowage of the bags. The result was 150 man-hours to repair the speed brakes when the landing was made with them extended.

Don't forget that a cross-country airplane normally carries its own down locks, wing fold jury struts, gust locks, and so forth. Where do you put them?

One F-8 pilot had the stuff put in the port expended link and case compartment. During flight one jury strut shifted and allowed the attached chain to drop into a small hole in the right side of the compartment. It became entangled in the nose gear lock assembly and the landing was made with the nose gear unsafe. Hydraulic pressure alone had held the nose strut extended.

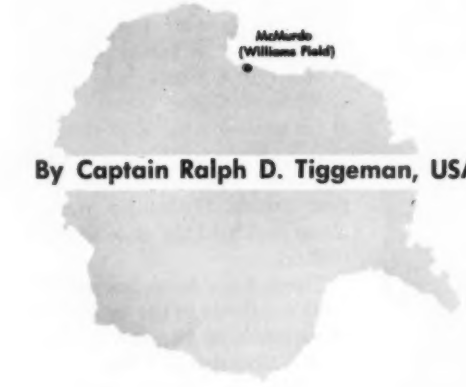
There have been unexplained fatal accidents in the past where the subject of baggage and aircraft accessories has been brought up, but dropped for lack of evidence. Unfortunately there is no certainty that it will not become a factor in some future mishap.

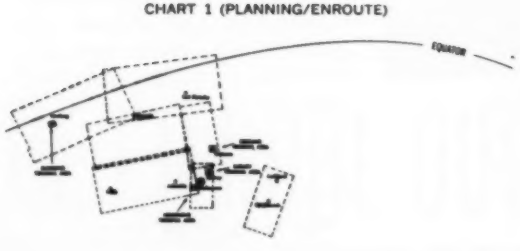
APPROACH can make no predictions or recommendations except to review gear stowage requirements and practices and insure use of proper care and discretion by pilots and plane captains.

Personal gear in the cockpit caused landing with speed brakes down.

'FLIP' Goes Down Under

By Captain Ralph D. Tiggeman, USAF





A new Flight Information Publication (FLIP) package is being issued by the Aeronautical Chart and Information Center (ACIC) in early 1964 to cover the area *down under*. Its title: USAF/USN FLIP Australia, New Zealand and Antarctica. Area of coverage will be just about everything south of the Equator between 110 degrees west and 100 degrees east.

You may want to think of this FLIP package as a twin of the present FLIP Pacific and Southeast Asia. Not only will they have a common border tied into one another by bearing and distance arrows, but they will both contain Planning, Enroute and Terminal Area Charts. The capabilities involved in this set of twins are impressive. For example, let's say that an air transport unit is deployed to a civil aerodrome in the Pacific or Far East. Possession of these two FLIP packages will provide the commander, operations staff, and flight crews with preliminary flight planning, enroute navigation, and terminal area information for a tremendous area — from the west coasts of North and South America all the way to India and from the Bering Strait all the way to the South Pole — roughly one third of the world.

There are two factors that make production of this FLIP significant:

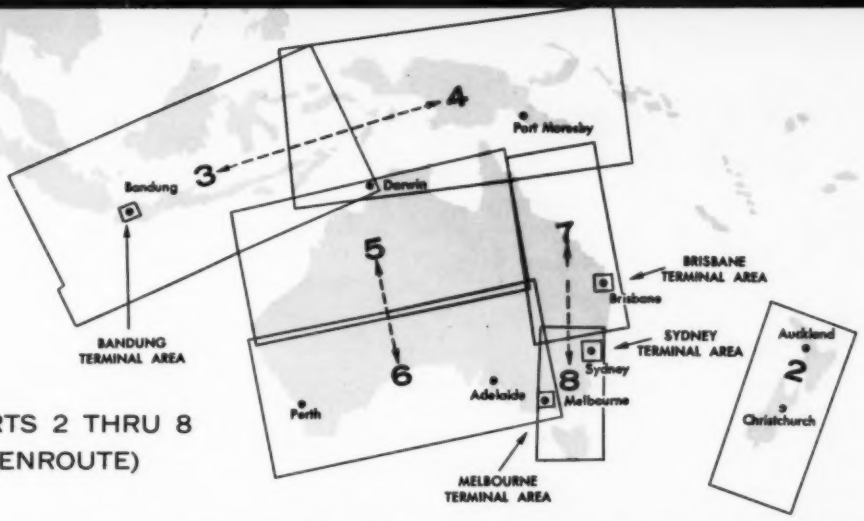
- USAF/USN FLIP coverage will have been expanded to encompass the entire "Free World" area — everything this side of the Iron and Bamboo Curtains. AIC currently provides FLIPs for the United States — Alaska — Canada and North Atlantic — Caribbean and South America — Europe and North Africa — Africa and Southwest Asia — Pacific and Southeast Asia.
- The charts of this new FLIP series were developed following the current USAF/USN concept of providing Planning, Enroute and Terminal Area Charts as an integral part of the in-package, FLIP chart family. Thus, this new FLIP package will contain the following 11 charts:

Chart 1 will list both Planning and Enroute information.

Charts 2 through 8 will list Enroute information.

Chart 9 will represent a Special Operation Deep Freeze chart of Antarctica.

Charts T-1 and T-2 will contain blow-ups of congested Terminal Areas (Sydney, Melbourne, Brisbane and Bandung).



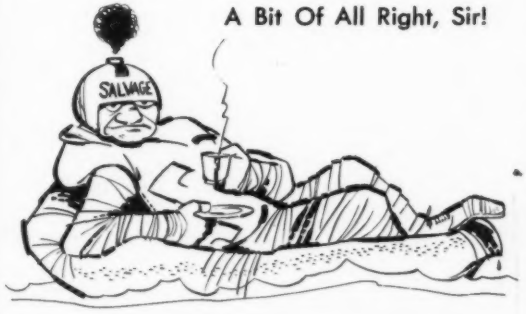
CHARTS 2 THRU 8
(ENROUTE)

Charts 5, 6, 7, and 8 will cover Australia and will be similar in design and format to existing Enroute Charts. To be noted is the fact that Australian air routes and control areas are based on a combination of Radio Beacons (RBns), Visual Aural Ranges (VARs), and Distance Measuring Equipment (DME) stations. *The DME stations are not compatible with USAF/USN airborne receivers and, therefore, are not depicted in the USAF/USN FLIPs.* Australian air traffic control agencies will provide non-DME equipped aircraft with clearances and instructions that will *not* require the use of DME. USAF/USN pilots are cautioned *not* to indicate operational DME in flight plans based on the aircraft being equipped with standard USAF/USN Tacan or VOR/DME since this will incorrectly indicate a capability of complying with procedures based on DME positions.

Chart 9 was designed to support Operation Deep Freeze flights to and from Antarctica and New Zealand and within Antarctica. Distribution of this chart will be on a limited, special order basis. *If you require this chart for operations into Antarctica and have not specified quantity requirements, requisition should be submitted.*

It's hoped you'll like flying with this set of Far East FLIP "twins." If you have comments — good or bad — please send them to Headquarters, Aeronautical Chart and Information Center (ACOR) Second and Arsenal, St. Louis, Mo. 63118.

A Bit Of All Right, Sir!



AN Australian pilot had been forced to ditch his plane in the sea off Korea after an air strike against Communist forces. His comrades flew overhead making a protective umbrella. As the flight leader spoke to headquarters, the following was heard:

"Officer Atkins is bobbing about in his dinghy approximately 500 meters from shore."

"What is the condition of Flight Lieutenant Atkins?" asked the commander who was monitoring the broadcast. "Should a pickup be attempted?"

There was a slight pause while the pilot dipped low to make a closer examination. Then he replied cheerfully, "Sir, I do believe Officer Atkins appears to be quite salvageable."

—Contributed by Captain Carl R. Venditto, USMC, courtesy U.S. Naval Institute proceedings

TAKE ANOTHER LOOK!

The greatest single obstacle to the prevention of aircraft accidents is complacency – people become accident conscious after an accident happens. Sound familiar? We have been hearing about complacency for quite some time now. It is obvious that people become acutely accident conscious after a crash.

Certainly this is the time when everyone becomes concerned over the squadron's safety program. It's easy to sell safety to all hands when destruction hits home. Safety takes on a new meaning.

Flight and ground procedures that were accepted as the only ones possible are now inadequate. Shortcomings, tolerated as necessary before, are now eliminated. New guide lines, new techniques, new standardized procedures, new maintenance practices, are now inaugurated.

We safety officers have something to sell. Our safety program is dynamic . . . a program with a goal, "The prevention of accidents."

The success of any endeavor depends upon the attitude of the people involved, including their degree of acceptance. What better time to capitalize on acceptance of the safety program than after the accident. But was it really necessary to have that accident to make our safety program dynamic? Acceptable?

Aviation safety becomes a conscious part of everyone's thinking. Pilots, aircrew members and ground personnel observe sound safety practices. Councils and committees foster the safety program. NATOPS becomes an integral part of all flight and ground procedures. Safety education and training is prevalent throughout the squadron.

Time passes, and as we pick up steam, our goal, accident-free operations, becomes a reality. We now have the statistics to prove that our program is a success. A good safety program, and thousands of hours – accident free. By now our safety program is at the height of its popularity and momentum, but the accident that gave our program impetus begins to fade from memory.

We are proud and satisfied, as we should be. We are doing as well, and perhaps better, than any of our contemporary squadrons. Our successful safety record is worthily noted in several safety publications and we are a strong contender for the annual CNO Safety Award. Promoting safety is pretty easy once you get the hang of things.

Well, where do we go from here? Do we think so much of our safety program that we can honestly say that we are better than any other squadron? Have we reached the ultimate of safety through practice?

Perhaps we should take another look. Is it possible that our safety program has reached a point of stagnation? *Are we promoting accident prevention or are we really protecting our record?* Is it possible that protecting our safety record is now our primary objective and how far would we go to protect this record? Certainly we wouldn't hesitate to send in a report of a flight hazard, or would we? What about that ground incident that could have been a ground accident, except for the fact that it didn't meet the man-hour requirements? – the one that was revised several times to keep the time below that required for a ground accident! Have we followed through on the discrepancies found on our last safety survey or does the circular file contain "should have been's"?

When we feel our program is so effective that we need only to announce its name as a reminder to continue safe operations, our program has reached a dangerous shoal. There is an innate tendency to just be satisfied and ride along when things are going smoothly. After all, you cannot argue with success. But merely keeping the name of safety before everyone does not prevent accidents and being complacent can be more dangerous than covering up.

The temptation to seek recognition can be great and the results disastrous. To measure the effectiveness of safety by an accident rate can be a great fallacy. Any dynamic safety program must have for its only goal the prevention of accidents and the safety program must always remain aggressive! You should be proud of a good accident record, but never satisfied.

Don't wait for that *next* accident before you take another look. Remember, the safety program is designed to fit a recognized need – the prevention of accidents. KEEP IT DYNAMIC!!

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This article was written by an advanced flight student at the request of the unit safety officer after a wheels-up pass. It appears that this student learned a vivid lesson. His reflections may well benefit all concerning this age old problem.

How to Prevent a Gear-Up Pass

"One one abeam, gear down, prop up."

"Take it around one, one, your gear is up."

These radio transmissions were made in the student FCLP pattern at Cabaniss Field. I had just made a gear-up pass. What caused it? How could it have been prevented? How can I prevent it from happening in the future?

I can only speculate at what may have caused my particular gear-up pass, for no one can ever say for sure that any certain incident or series of events was precisely responsible. Among the leading causes is failure of the pilot to use the landing check-off list. Others are complacency, breaking of a habit pattern, failure to double check by eye, and distractions to the pilot. While these factors are not all inclusive, I believe they are the most important ones.

Failure to use the checkoff-list and complacency go hand in hand. After a couple hundred hours of flying, a pilot may come to the conclusion that he knows what the game is all about. He might figure these things are for primary students. He thinks he *knows* what he has to do and doesn't need a check list to tell him. This pilot has just set himself up for a gear-up situation. He's ripe. All humans are fallible, and being human, this pilot will sooner or later make the mistake of forgetting his gear.

Most pilots have an established habit pattern for landing situations. Having completed the major portion of the check-off-list approaching the field, he has only the gear, flaps, and prop left to go. His habit pattern may take the following form. Gear down at the break or upwind turn. Flaps down and prop up when headed downwind. When this pilot makes a gear-up pass, it is usually the result of a break in his habit pattern. Perhaps he has had to waveoff after one pass during a heavy traffic period, receive instructions from the tower, or try to take interval on aircraft ahead. Perhaps he has been cleared for a straight in approach. These situations run contrary to the pilot's normal habit pattern, and can result in a gear-up pass. This, of course, is assuming that the pilot relies too heavily on habits.

This brings us to the fourth contributing factor. There have been cases where the pilot has religiously followed the check-off-list and physically placed the gear handle in the down position, only to find upon landing that the gear were not fully down. In other words, he did not visually check to see that they were indeed down, or at least indicating down on the gear indicator. Aircraft are also fallible.

The final factor that I have considered as contributing to the gear-up pass, is distractions to the pilot. These distractions could range from untimely radio communications from the tower or LSO, to an emergency such as a rough runner or complete engine failure. It is conceivable that the pilot could be distracted enough to completely forget about putting the gear down.

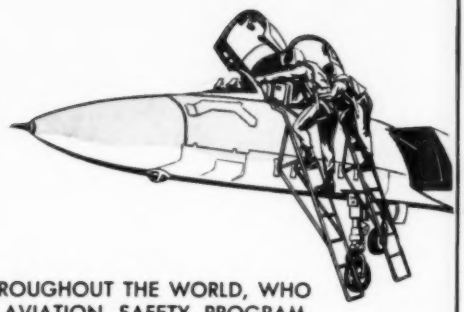
While it is impossible to prevent the gear-up pass that has already occurred, I feel that, knowing some of the causes, the following measures can be taken to prevent a similar performance in the future.

Primarily, and of greatest importance, is the religious use of the checkoff-list printed in the cockpit.

Secondly, I intend to develop a good habit pattern incorporating the use of an abbreviated checkoff-list containing only the items *gear, flaps,* and *prop* as a backup for the longer checkoff-list. This, in turn, will be backed up by a visual check to insure that the gear indicate down and that they appear down outside the cockpit.

Finally, as a double check, at the abeam position I will recheck the gear down before reporting it down over the radio.

OP NOTES



EXCERPTS FROM SOME OF THE NAVY'S SAFETY COUNCILS THROUGHOUT THE WORLD, WHO PROVIDE LOCAL LEADERSHIP AND EMPHASIS TO THE NAVAL AVIATION SAFETY PROGRAM.

Transmissometer

The Transmissometer is being turned on for visibility readings only when required. This should effectively prevent the light from shining into pilots' eyes who are on final approach.

ComFAirJapan/ComNABJapan

Night Towing Of Aircraft

A-5 and TA-3B aircraft do not have batteries. These aircraft when towed at night do not display wing or tail lights. As a result, the tower operators and the pilots of taxiing aircraft cannot be sure of the actual location of towed aircraft.

Locally manufactured suction cup holders and flashlights (red and green) will be provided by NAS Maintenance. They will be available at NAS Operations for use on the wings of towed aircraft. NAS Maintenance is attempting to obtain tractors with electrical provisions in order to light the navigation lights of towed aircraft. — *HATWing 1*

Morest Lighting

White spot lights will be mounted on the Morest Unit so as to light the runway center line at the cross-deck pendant. This will help pilots find the center line for arrestment. The lights will shine across the runway at a low angle and will not shine in pilots' eyes.

ComFAirJapan/ComNABJapan

Fire Extinguishers

The fire chief has again pointed out that flight line CO_2 fire extinguishers are not receiving proper care in that safety pins are being removed, seals are being broken, excessive amounts of gas are being wasted due to the fact that using personnel have a tendency to want to "test" these bottles, and that extinguishers are being removed from assigned locations. He further stated that safety officers should assure that qualified and responsible persons are assigned to inspect their extinguishers daily to assure their serviceability and readiness. To improve the conditions on the flight lines and inside hangars, the fire chief has assigned three military fire inspectors to the Crash Station, whose primary duties will be to constantly inspect flight lines and hangars. Further, a new system of assuring squadrons that fire extinguishers exposed to weather elements have been currently inspected, is being tested. This will include the required 3" yellow reflector tape applied to CO_2 extinguishers with a red plastic tape indicating the day and month the extinguisher was inspected. The red plastic tape will replace the fire extinguisher inspection tag which was found to be inadequate for its intended purpose.

ComFAirJapan/ComNABJapan

Blue Jackets Use Red Jackets

Red fluorescent vests have been fabricated in an effort to make it easier for pilots to sight Plane Directors on the line.—*NATechTraCom*

Saturday Breakfasts

The Station Aviation Safety Officer conducts a weekly safety briefing each Saturday morning at the BOQ for Organized Reserve Squadron Safety Officers to bring to the attention of the squadrons the latest information pertaining to aviation safety. It is recommended that all squadron Aviation Safety Officers, including those from the Marine Air Reserve Training Detachment, attend this meeting to better enable them to disseminate current information to their respective squadrons.—*NAS, Seattle*

Signal Practice

Several instances of aircraft intentionally dropping tail hooks while taxiing forward after recovery without the plane director signaling for chocks has been noted. As this is the emergency signal for loss of brakes, positive action for chocking the aircraft must be made instead of just signaling for the hook-up. This will again be brought to the attention of all plane directors.—*USS* FDR

Ramp Area Lighting

Perimeter lighting will be installed around the east and south sides of the parking ramp. Further a contract is being written to install pancake taxi lights inboard of the perimeter lighting.—*NAAS Meridian*

Worth the Time

Chock walkers will continue to be used to bring aircraft in and out of spot. While this may slow flight deck operations, the apparent safety margin will be well worth the cost.—*USS* FDR

Beware the Numbers

Pilots arriving at Air Force bases in the European area have been given braking action in terms of numbers rather than adjective descriptions. Without the technical order that establishes the numerical coding these numbers are meaningless.—*ELM*

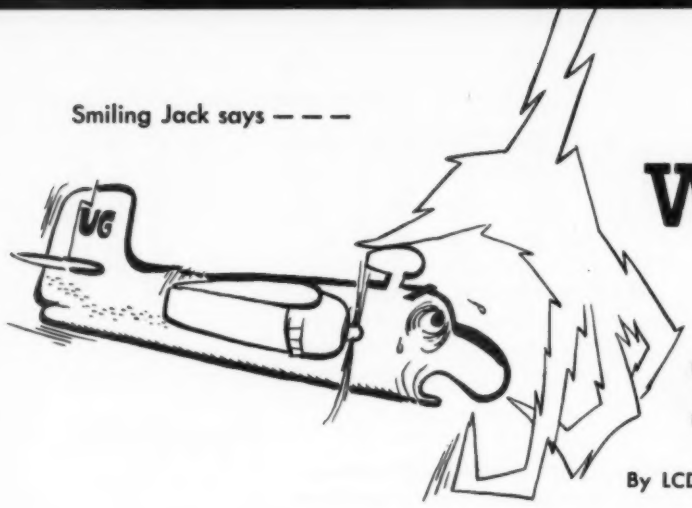
Guideline

A yellow line has been painted around the hangar 50 feet from the nearest obstruction to aid the tractor drivers when towing aircraft. In addition two wing walkers are required in the hangar area. Fuel trucks should be parked at least 75 feet from the LOX Carts.—*NAAS Meridian*

Take Off the Tape

The VMA-212 Aviation Safety Officer discussed two recent cases involving loss of the aircraft static system in flight. In one instance, the pilot went IFR shortly after takeoff and remained IFR until topping the overcast at 8000 feet. When the aircraft were washed, the static sources were covered with masking tape. In both cases, the tape was not removed after the aircraft were washed. The pilot also failed to see the small masking tape covers during the aircraft preflight. The squadron has briefed all concerned with the problem and has also implemented a procedure of attaching a flag to the static source covers.—*MAG 13*

Smiling Jack says — — —



Watch the Red Lightning!

By LCDR Irwin Patch, Jr.

The first leg of our San Diego-Glenview haul had been uneventful. We planned the flight well and I had made the landing at El Paso look easy. If landing the *Stoof* is easy then touching down on International's long, wide, jet-smooth asphalt was sheer pleasure.

Our weather briefing for the next leg included a thorough rundown on the thunderstorm activity in the Amarillo-Gage area. The storms were expected to continue until midnight.

We took off for Navy Olathe at 2300 Mountain Standard Time. Smiling Jack had taken the left seat for the second leg as I handled the pencil and computer. We made the turn over the Rio radio beacon atop Hueco mountain at our assigned altitude of 9000 feet and set a course for the Walker tacan.

Jack busied himself with engaging the autopilot and making minor prop pitch control adjustments. I completed the final transaction with El Paso departure control and made contact with center. We were over Waterhole intersection at time 16. I logged it for posterity as the thought crossed my mind that it was still hot, even at nine thousand feet. I adjusted my posterior and rubbed the evaporating perspiration from my nose. I reflected briefly on the possibility of Jack considering my movements part of a planned erogenous action. I dismissed the thought and asked Jack how we were doing.

Jack, always the professional, smiled and said, "Pressures and temperatures normal, Buddy, on course, on speed, on altitude. When are you going to tune in Walker?" I flipped the channel selectors to channel 35 and watched the tacan course needle begin rotating.

Jack said, "Why don't you try channel 36?"

"Damn perfectionist," I thought. How did he know I had selected the wrong channel? But then, he had planned the flight. I corrected the minor error and extended my interest in the flying business by listening for the station identification signal. A scratchy "Lima-Kilo-Romeo" was recognized. I was tempted to flip Jack's Nav toggle to let him hear the ID but thought better of it.

"Did you see that!" he suddenly exclaimed.

I had been taking ground checks but I saw it. There was a real thunderbumper up there somewhere. It had lit up the northern skies in a fiery glow.

We were droning past Walker now. Walker approach bid us goodnight and asked that we contact Cannon approach. Cannon responded to our communications check and we inquired of the weather ahead.

"Amarillo radar reports several cells to the north of their station, Navy S-2." I thanked them for the delightful news and lapsed back into thought. The severe weather warning only extended 'til midnight, Mountain Standard Time, and it was just about midnight. I had ridden through many a storm in the *Stoof* so I wasn't too scared — just concerned. We droned on.

Cannon approach cleared us to contact Amarillo approach. "Amarillo approach, this is Navy —, we're 26 miles from the Buffalo tacan on the 215-degree radial." They acknowledged and gave us a contact five miles ahead, closing. I peered out intently. Jack raised from a relaxed position and sat poised for immediate action, if necessary. He disengaged the autopilot.

"Navy —, your traffic is now

twelve-thirty at two miles." I scanned the skies and there it was – the El Paso Express, rattling along on the mesa over a mile below.

"Amarillo approach, this is Navy ––, we have the traffic well below us." The tone of Amarillo's "Roger" told me that they had known what the traffic was.

"There it is again!" Jack exclaimed. No need to, though, for I had seen it. A real granddaddy of a thunderhead up there was spurting out lightning like an erupting Vesuvius. I took a bearing – 010 degrees magnetic.

"Amarillo, do you have any weather cells on your scope?" I rationalized that there would be a delay while he raised his tilt.

"Navy ––, this is approach, we have quite a bit of weather to the northeast and to the northwest. You can miss all the activity by proceeding to Liberal from over Amarillo." I glanced at the chart. Liberal was bearing 010 degrees magnetic.

We went into it fast. First came the altostratus. I secured the anti-collison lights. Then came a clearance to contact Albuquerque Center. Suddenly, the sky was transformed into a sea of lightning – predominantly white and yellow. But always to the left of course came that horrible crimson glow from the spectacular extravaganza that we had been viewing for over an hour. The spectre of wandering into red lightning weighed greatly on my desire to change course to 060 degrees magnetic.

"Albuquerque Center, this is Navy ––, forty-five miles southwest of Gage now. Request clearance to deviate from course, as necessary, to avoid this thunderstorm activity."

"Roger, Navy ––, you are cleared as requested. You're the only aircraft we've had in that sector for three hours." Now a comment like that would be cause for deep thought but we had no time for such luxury. We were about to go into the real thing and I decided it was time to complete the thunderstorm penetration checkoff-list.

All loose gear was secured – box lunches and nav bag were crammed behind the seats. Jack and I turned up the instrument lights to full bright. He confirmed that the pitot heat was on and I announced that the carburetor heat was 20°C. Then he slipped the mixtures forward and adjusted the props to 2100 rpm, 25 inches of manifold pressure gave us 128 knots indicated. We both adjusted the horizon bars on our gyro horizons. OK, thunderstorm, we were ready!

Rain began plummeting as the *Stoof*, skirting the edge of a large cell, began buffeting wildly. The lightning increased in frequency and intensity.

Jack yelled for more light on his gyro horizon. I directed my flashlight beam on the instrument while we rode through the storm. I reached up and turned off the birddog, HF transmitter, and reached back and pulled the circuit breakers to the range receiver and the marker beacon. Jack struggled intently in maintaining the penetration attitude. The aircraft shuddered as we hit torrential rains.

The *Stoof* began the roller coaster routine. As Jack held the attitude vigilantly the altimeter spun crazily upward to 10,500 feet. And then, the altimeter unreeled to 7000 feet. But always from the left came the brilliant flashes of red lightning. Jack, having eased to 060 degrees, came further right to 090 degrees.

Now came the real hazard. As hail popped against the windshield and metal skin of the fuselage, Jack tensed up a little. I drew a finger across the brow and discovered my perspiration was cool. We had the turbulence licked; there was no icing in the clouds and the lightning was letting up. But what can one do against marbles or golf balls of hail? We hung on, hopefully, and broke out into the clear of a Kansas night.

"We'll be on the deck at Olathe about sunrise, Jack."

Jack nodded as he turned up the tacan audio to hear the Emporia ID-dit,da,da,dit,da da dit. I could sense Jack weighing the significance of my remark. He took great pleasure in logging night landings. A flight was a failure if it ended before sunset or after sunrise.

"Navy ––, this is Kansas City radar, we hold a contact at twelve o'clock your position, six miles." I glanced down. There it was – the Kansas City Express. Brother, what a flight! Only two contacts in nearly five hours and both of them trains.

As we rolled out on runway 35 I switched to Olathe tower and heard "Navy ––, this is Olathe tower, we have you on at 56." After a moment's delay Olathe tower added, "Sunrise is at 57."

I glanced at Jack. He was smiling.

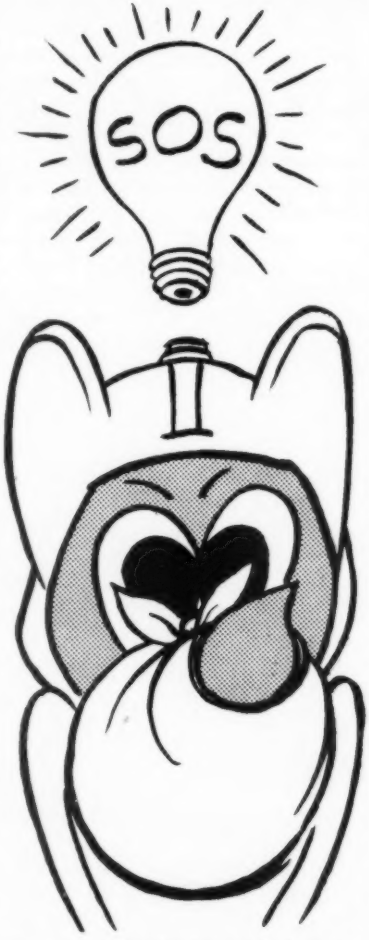
LCDR Patch is the past author of such APPROACH Stoof yarns as "Don't Give Up The Ship", "Feather Number Two", and "No Place To Go But Down." With over 2500 hours in the Stad and Stoof since 1954, LCDR Patch has ended up in many thunderstorms. However, he does not believe in seeking out thunderstorms but does believe that once encountered, a thunderstorm can normally be penetrated successfully by applying prescribed flying procedures.

NO COMMUNICATIONS

During a large exercise with a big push on to meet operational commitments, I was flying as a bombadier/navigator in the A-5A. On turnup I was unable to receive oxygen or read the pilot's ICS transmissions. An AME was called, and the upper *Scott* block was changed. This solved the oxygen problem although I was still unable to read the pilot on ICS although he could hear me loud and clear. It was decided to fly the mission anyway since the pilot could hear me.

Approximately 20 minutes after takeoff, I lost all oxygen and communications with the pilot at 39,000 ambient, 16,000 feet cabin altitude. I tried to inform the pilot that I had no oxygen by spelling it out in Morse code on lights I can control from the aft cockpit, as well as using the same system (code) by taking control of the UHF and spelling out "NO Ox" by flashing guard. However, the pilot only construed this to mean that I was still okay although he was aware of the communications loss.

The flight continued at 16,000 ft cabin altitude, and I slowly began to recognize the onset of hypoxia symptoms. In the order that they happened: Euphoria, restlessness, loss of vision, and unconsciousness finally. The period of unconsciousness lasted around 45 minutes and I was unaware of anything until making an approach to the force at a cabin altitude of approximately 10,000 ft. The time spent at 16,000 ft. was 2½ hours.



Upon landing I reported to the flight surgeon who prescribed aspirin and rest for a roaring headache and grounded me for 24 hours. Other than the headache and a feeling of tiredness I suffered no ill effects. After 10 hours sleep I was again fit and placed in an up status.

Investigation of the aircraft revealed a bent pin in the intermediate *Scott* block that prevented full seating with the lower block and consequently shut off all communications and oxygen including the bailout supply which had been activated. Since the failure was in the intermediate block all attempts at inflight fixing proved nil since the seat pan must be removed for access to the intermediate block.

How could this have been avoided? (1) By not allowing the pressure of the operation to force the pilot into launching without positive 2-way ICS. As a result of this incident squadron SOP has been set as prohibiting taking an aircraft without ICS. (2) Devise a system to allow usual communications between cockpits without ICS. A proposed solution is to have various UHF frequencies coded to mean simple but important messages such as 333.3 means I have no oxygen. This appears feasible and is probably the most simple proposal to date.

ANYMOUSE

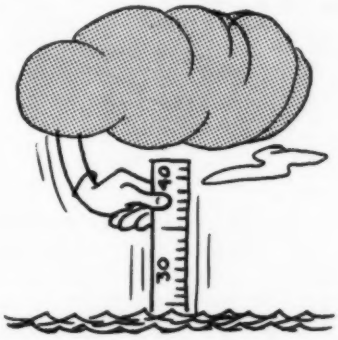
The purpose of Anymouse (anonymous) Reports is to help prevent or overcome dangerous situations. They are submitted by Naval and Marine Corps aviation personnel who have had hazardous or unsafe aviation experiences. As the name indicates these reports need not be signed. Forms for writing Anymouse Reports and mailing envelopes are available in ready-rooms and line shacks. All reports are considered for appropriate action.

— REPORT AN INCIDENT, PREVENT AN ACCIDENT —

Pitot Lesson

We were standing by for a night screen hop in an SH-3A during round-the-clock ASW operations. The weather was about 1500 overcast with winds gusting over 40 knots. The deck was pitching and rolling and fixed wing operations had previously been cancelled. We were launched late after a turnup and check for hydraulic leaks.

On takeoff we started our climbout carrying 70 percent torque and looking for 70 kts airspeed but after liftoff the airspeed remained the same as the deck indication, 20 to 30 kts, and the barometric altimeter remained about 60 feet. My immediate thought was that the pilot covers had been left on but I remembered checking them during preflight. I continued climbing out on my remaining altitude indicator, the radar altimeter, to what I thought was 1000 feet and told center I was declaring an emergency and wanted an immediate landing. I steadied on my vector around to final bearing and started a slow letdown to approach altitude of 600 feet



and remained the same till after shutdown on deck. As I neared 600 feet on the radar altimeter, it suddenly dropped to the peg and bounced once. I pulled in maximum power and rotated the nose, glancing out my window all I could see were whitecaps beneath my feet and I braced for the impact. I climbed into the overcast and had to let back down. I wasn't going to lose sight of the ship again since I had no tacan at this time.

I asked my copilot to lower the gear and center turned us to final. I picked up the meatball and made a very gentle letdown to a landing, thankful to be back.

Upon landing I found masking tape wrapped around the pitot tube static holes; realizing this was my trouble I could have broken the glass on the barometric altimeter to introduce static pressure to the pitot system. On final I had considered turning pitot heat ON in case I had ice in the system, but it was not that cold.

There was no indication on the yellow sheet the pitot system had been repaired. In the future there will be streamers on pitot systems taped for test and I will never miss the pitot tubes on preflight.

DF Capabilities

While flying VFR on-top (before the days of Area Positive Control) enroute to NAS ——— from the west coast, I suddenly found my *Skyhawk* without tacan or SIF. I decided to divert to a closer air station and requested the center assign me a UHF frequency whose transmitter was in the general vicinity of my divert field so I could use the AN/ARA-25 (UHF/DF) receiver for navigation. The center never did get the idea, even though an emergency was declared. All of their efforts were concentrated on establishing a DF triangulation plot, which was unsuccessful.

By the use of DR, DF and GCA I finally made a straight-in approach in rain and poor visibility. When I reached the chocks I shut down with 140 lbs of fuel aboard.

This Anymouse would like to recommend that:

- All pilots be reminded that ARTC centers use remote transmitters which may give undesired UHF/DF bearings when the location of the transmitter is not known.
- The ARTC center personnel be informed of the AN/ARA-25 capability of naval jet aircraft.

An informal inquiry into this problem by the Safety Center indicates that some FAA Centers may not be aware of the military UHF/DF capabilities. NASC Letter serial 1063 made this fact known to the Chief of Naval Operations and recommended that wide dissemination be given to FAA controlling activities concerning the availability of UHF/DF and VHF/DF as a secondary navigational aid in naval aircraft.

F-8 Wing Lock

The pilot took off in his *Crusader* prepared to engage in night missile intercepts. After becoming airborne, he placed the gear handle up, the wing handle down and the wing locking lever in the LOCKED detent, yet the Wheels, Wing and Droops light continued to glow.

The pilot decreased power to stay below 300 knots and started investigating. The droops were indicating DN, no trouble there, and three UP in the landing gear indicators told him his gear was not the reason for the light.

Reasoning that an unlocked wing was the only other thing that could account for the bright red light, he slowed to 220 knots and lowered the gear, then tried to unlock the wing. The lever would come out of the LOCKED detent but with normal pressure applied, the locking lever would not move aft.

After much discussion with squadron pilots both on the ground and in the air, the pilot decided he would have the wing locking lever snugly in his pocket before attempting a wing down landing at *night* on an 8000-foot runway with the blue Pacific Ocean waiting at each end.

Several one-handed attempts later, the pilot trimmed his aircraft as nearly hands off as is possible with the *U-Bird* and using both hands on both the wing incidence handle and the locking handle, simultaneously, was able to unlock and raise the wing. An uneventful landing was accomplished.

The maintenance department was able to duplicate the incident on the ground by utilizing the following:

- Wing down and locked.
- Reduced hydraulic pressure supplied by hydraulic mule.
- Move locking lever aft but not in UNLOCK detent.
- Raise wing.
- Lower wing and immediately place locking lever in LOCKED detent.

It was observed that the locking collar on the variable incidence wing cylinder was not rotated sufficiently to free the plunger inside the cylinder, but was rotated sufficiently to unlock the wing, permitting raising and lowering the wing. However, under the conditions stated above, the locking lever could be placed in the LOCKED detent and the locking collar rotated to the locked position prior to the wing being fully down. The result was the locking lug on the VIW piston came to rest on top of the locking collar on the VIW cylinder. In excess of 3000 psi hydraulic pressure was holding the wing down and binding the locking collar and consequently the locking lever.

Pilot education is being restressed to include:

► Visually check the locking lever in the UNLOCKED detent prior to moving the incidence handle UP.

► Allow the wing to come down (fully) prior to moving the locking lever to the LOCKED detent after takeoff and

► Lock the wing down prior to shutdown on the ground.

Haste Makes Waste

Our squadron has experienced two cases of air sickness and other generally low feelings by attempting to hurry up when replacing the laminar seals on oxygen masks. After using Firestone's general purpose adhesive, "Loxite", we failed to hold the mask in the shop and allow same to properly dry. We slapped on the seal, and permitted one pilot and one third crewman to go aloft for a flight.

Both came back complaining most bitterly, and for just reasons. Had the directions on the container, been followed, and the seal allowed to dry overnight, this problem would not have come up. We now refuse to allow a mask out of the shop for at least twenty-four hours after replacing the laminar seal. In this case we could have lost an A-3B and the three personnel aboard.

Odd Twist

HERE'S a tale with an odd twist — "rescuees" going to the assistance of a "rescuer."

A safety crewman was riding in the aft crew seat of a UH-25B on a flight to train crewmen in simulated rescue operations. Seeing the hand crank for the rescue hatch lying on the deck, he released his lap belt, moved aft and crouched on one knee to pick up the crank. As he did so he stumbled over the copilot's collective and fell backwards through the hatch to the water 30 feet below. He grabbed the aircraft wheel as he fell but lost his grip when the wheel turned. The next thing he remembers is being in the water with his life vest inflated. He felt pain in his back but no sensation below his hips.

Two crewmen taking part in the exercise swam to his assistance and helped him deploy and inflate his life raft and fire his distress signals.

The helo pilot was unaware of what had happened until the aircraft landed. When a crewman tapped him on the shoulder, he turned around and saw that "the chief wasn't there." Then the crewman pointed out to sea. The pilot saw a red flare and, realizing what had happened, took off again.

Because of his strained back the survivor was unable to get into his raft after it was inflated. One of the swimmers in the exercise climbed into the raft, put his knees under the survivor's armpits and slid backwards pulling him into the raft. The surf was too rough to swim with the raft to shore so the crewman was hoisted back into the aircraft from which he had fallen. He had already removed his hard hat and, before helicopter hoist, had the men assist him in removing his life vest. (*He should have retained both pieces of equipment until the rescue was complete. — Ed.*)

Confusion

Confusion seemed to be the planned word of the day for this CVA working off the east coast.

Having the COD visit the ship is always a welcome occurrence, so we COD's are told. After spending 45 minutes in delta, the COD entered the traffic pattern following an A-3. Downwind, base and final were normal until the aircraft reached the cut position. Then all hell broke loose.

Upon reaching cut altitude the LSO (a trainee type) came out with the brilliant word cut, and after a delay of one or two seconds, activated the mirror lights. What ho — the red flashers lit up the whole area.

This has now put me into a position of answering a double mandatory shipboard signal. As most carrier pilots know, you fly the LSO signals as reflexes, both oral and visual. When I heard the word cut, power immediately came OFF (a full power cut is taken in a prop aircraft) and then I saw the big red flashers. What do I do now, coach? Automatically full power was applied, and thanks to a light load and the great climb performance of the C-1A, I missed an in-flight engagement by approximately 1½ to 2 feet.

This Anymouse and squadron, feels that the double signals (verbal and visual) used together by most LSOs should be abolished. Since this carrier Navy has outgrown the needs of paddles and graduated to the mirror and angle deck, only one signal should be given, the mirror cut and waveoff lights. Helpful hints should still be given by the LSO until the air craft reaches the committed point of the approach where the appropriate signal is given. In this way there would be no confusion of hearing a verbal mandatory signal, then receiving an opposite mandatory mirror signal. This proves to be a real booby trap — and is one that can be eliminated.

STEEL-TOED SAFETY SHOES

Dear Headmouse:

Would you please give me some information regarding the present status of steel-toed flight deck shoes. If they have been approved, I would appreciate any information on their availability in WestPac and their FSNs.

I have been questioned about the incidence of collapse of the protective cap when run over by main mounts of some of our heavier aircraft. I would appreciate any information regarding this question and also strength specifications for the flight deck safety shoe if available.

MEDIMOUSE

► At the time your letter was received, the Safety Center was making a statistical study which had bearing on your inquiry. On completion of the study, NASC recommended to CNO that flight and hangar deck areas be specifically designated as foot hazardous areas by publishing changes to all references which control the issue of safety shoes. CNO forwarded this recommendation to BuWeps and BuSandA for comment and return.

The study, based on the Monthly Report of Injuries submitted from 25 aircraft carriers over a six-month period, showed that of a total of 1534 accidents occurring on or around the flight and hangar area, 165 or about 9 percent were foot injuries. These men were not wearing safety shoes. Major causes of these accidents were aircraft or mobile support equipment running over the foot, and heavy objects such as boxes, fire bottles, fuel nozzles, tow bars, ammunition and oxygen cylinders being dropped on the foot.

The Naval Aviation Safety Center holds no reports of collapse of toe caps when run over. Strength specifications for flight deck safety shoes are the American Standard Association specification Z-41.1-1944. The Section H Allowance List carries the steel-toed safety shoes for maintenance type personnel as Shoes, Safety Molders', FSN D8430-266-2793,-2794, etc. The present allowance is as stated therein.

BuSandA has commented that shoes manufactured under MilSpec S-21894 could be modified to provide the necessary foot and toe protection with the advantage of slip resistance. When word is received from BuWeps and the final word from CNO we will pass it along.

Thanks for your inquiry.

Very resp'y,

Headmouse

Unlike the flight control systems on present day high performance aircraft—the Naval Aviation Safety Center desires a continued feedback.

Has information in any Safety Center publication ever helped you to prevent an accident, avert an injury, or deal with an emergency in a better way?

If so, and you have not already informed the Safety Center, it is particularly desired and important that you do so. Such feedback is vital to all departments at the Center and for fiscal support of our safety research and education program.

Helo Pilot's Flashlight

Dear Headmouse:

An offhand comment and question concerning the method of wearing a flashlight while flying a helicopter at night led to the development of a piece of hardware costing only pennies which, it is felt, could save a life.

Most helicopter drivers, while night

Have you a question? Send it to Headmouse, U. S. Naval Aviation Safety Center, Norfolk 11, Virginia. He'll do his best to help.

flying, wear their flashlights around their necks on nylon line, often parachute shroud line. A squadron pilot offered the comment one day to the aviation safety officer that, in the event of a cockpit fire, the nylon cord could cause serious injuries if it happened to be touching any exposed skin of the neck. This generated a discussion concerning also the possibility of the cord becoming entangled in the cockpit during an emergency exit. It would be impossible to break the cord and the time delay while the pilot attempted to cut it or free it might be fatal.

As a result of the discussion, it was generally agreed that a better method of attaching the flashlight to the pilot was desirable. The problem was deposited in the laps of the flight equipment crew and the result is briefly described as follows.

A loop is formed in one end of the nylon strap. A hook with a spring keeper is sewn in the other end. The looped end is slipped over the one cell flashlight attachment strap on the life vest and the flashlight is hung on the hook. This eliminates altogether the uncomfortable and possibly hazardous cord. The device has been evaluated by a number of pilots in the squadron and they report no reduction in the accessibility or mobility of the flashlight. The CO is highly enthusiastic concerning the idea and has directed that all life vests in the squadron be so modified.

R. E. DYER, ASO
HMM-161, MAG-13

► This appears to be good for you as a helo pilot except under those conditions when you are wearing a parachute — it might change your looks a bit if you should bail out.

The problem of how to carry the flashlight safely is not restricted to helo pilots. It is even a greater problem for recip pilots and pilots flying ejection seat-equipped aircraft. Some hazards are 1) Flailing when bailing out or ejecting; 2) Lanyard entanglement during emergency egress; and 3) Availability when needed (electrical failure during night, etc.).

It seems the answer to problem (1) is to secure the end of the flashlight with a snap fastener — but then, of course, we sacrifice availability to some extent. The entanglement hazard can be made negligible by making certain the lanyard strength is such that it will support the flashlight under normal usage but would break if hung up.

Any other readers have a possible solution to these problems?

Very resp'y

Headmouse

Backfires

Dear Headmouse:

We talk a lot about abuse to yellow equipment — Let's go further and include red equipment.

When crash rescue trucks make the run from base side to the crash shack side a number of backfires can be heard from the bigger units all hours of the day, so I don't believe it's peculiar to just one crew. Furthermore I've seen and heard this at Cecil, Gitmo, Jax, Whidbey, Kodiak, Quonset, Oceana and Key West.

Backfires are detrimental to engines, mufflers, etc. These could be caused by switching ignition systems off and on or by rapid opening and closing of throttles. This also can be a contributing factor to down time we have concerning crash equipment.

A down rescue vehicle can't save anyone. More training and awareness of the real importance of red vehicles is in order.

ANYMOUSE

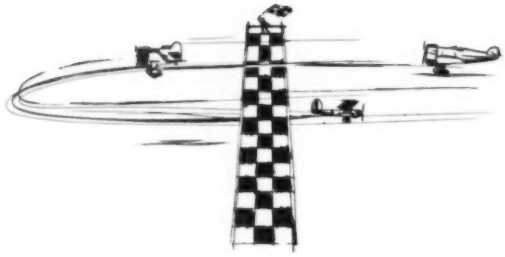
► Agree that abuse can contribute to down time of red equipment but we're sure that Ops Officers and Crash Crew Captains are well aware of the importance of crash and rescue equipment too. Consequently, proper emphasis is placed on the subject. A check into the problem indicates that most stations realize upwards of 90 percent availability and that lack of spare parts is the major factor contributing to down time. Engine failures and muffler failures due to backfiring does not seem to be a factor.

Backfiring is a characteristic of most big automotive engines affected by the type operation most MB-5 and MB-1 trucks undergo. Prolonged periods on the hot spot with attendant warm-ups result in engines loading up and building up of carbon deposits. To clear the engine high speed runs are necessary on occasion so fire captains direct or schedule same to insure the equipment will be ready to go when the crash alarms sounds.

Very resp'y

Headmouse

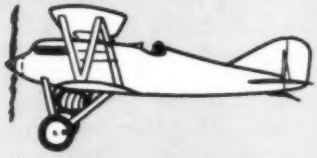
What we anticipate seldom occurs: what we least expect generally happens.-Disraeli



Racers

de

Curtis Kirkham
1920

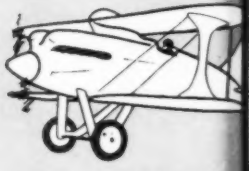


CRI
1921

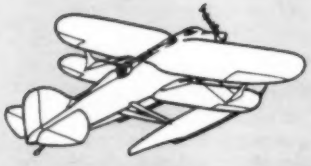
Beeline
1922

NW-1
1922

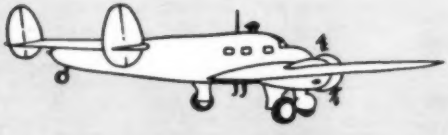
NW-2
1923



F2W-1
1923

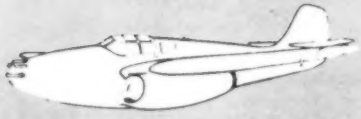


R3C-1
1925

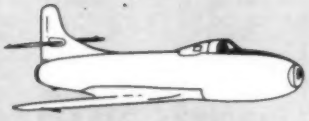


XJO-3
1938

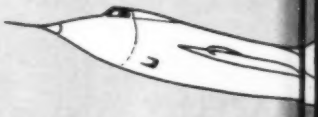
V-173
1942



P-59A
1944



D558-I
1947



D558-II
1949

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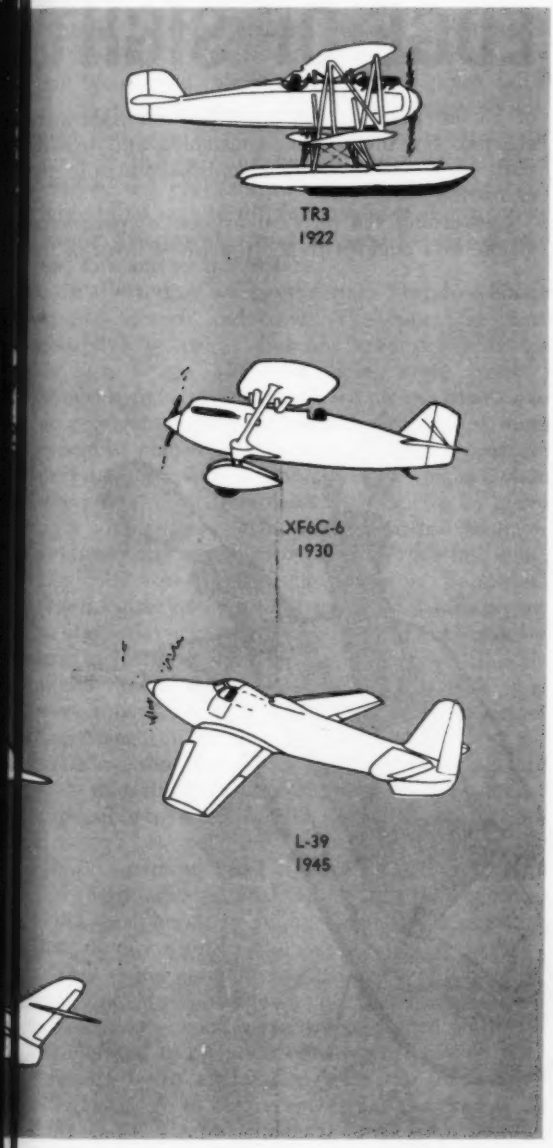
Written and Illustrated by
CDR Nelson Sabin



The words "Racers" and "Research" in the early days of U. S. military aviation could almost have been used as cognates. The "Old Timers" can relate first hand, to the now multitudinous youngsters, of the day to day battles fought by naval fliers and their protagonists during the two decades following World War I. To stimulate interest and the development of aircraft, air races and historical flights were sponsored, organized and flown. The Pulitzer Races, Schneider Cup and Curtiss Marine Trophy Races, trans-Atlantic and transcontinental U.S. flights, to mention only a few, were conducted to ultimately advance the state of the art in the designing and building of aircraft.

The Schneider Cup (seaplane) and Pulitzer races, commencing in 1920 and lasting through 1925, were two of the several annual events that stimulated tremendous public interest and intense competition between the Army and Navy. These races saw an increase in winning speeds of 93 mph – from 156 to 249 mph with top speeds approaching 270 mph. These and other races saw the last of the U. S. triplanes, and the development of the biplane "N" and "I" wing strut, the forged metal and three-bladed propellers, control surface push rods and internal control cables, retractable landing gear, wing skin type oil coolers and the very important streamlined cowling for the air cooled radial engine.

As the 1920s drew to a close, significant scientific data had accumulated. Along with this a gradual but steady development of testing, research and design facilities had taken place. The trial and error method of aircraft design was fading. Money was difficult for the Navy to justify for racing aircraft and a colorful and exciting period of aviation became history. A brief revival was evidenced in the late 1940s in the form of specialized research aircraft designed to penetrate hitherto unexplored flight regimes (D558-I and II).

An interesting comparison of the design and construction effort growth in the manufacture of aircraft is the "Spirit of St. Louis" vs a mid-'50 military jet fighter. The Ryan Company built their famous airplane in less than three months from the commencement of design until completion. Some 850 hours of design engineering and 3000 shop construction hours were required. Just 30 years later it required almost 1.5 million engineering man-hours for design and development of a then contemporary jet fighter prior to its first flight. The trend continues; increased performance, complexity, effort and cost.

Yesterday's dreams are today's realities in the air due to Racers and Research.

About Peripheral Vision

EDGE OF SIGHT

Peripheral vision is, of course, what you see from the sides when your eyes are focused directly ahead.

There are many ways of testing this vision. One of the easiest is to simply extend your arms out horizontally to the side and slightly back. Then, looking straight ahead, bring your hands slowly forward until you detect them in your field of vision. Note the location of each hand; that gives you a rough idea of the extent of your peripheral vision.

A more accurate way of testing peripheral vision is with a "tangent screen," where you focus on one spot while a small wand with a 5mm circle on the end is brought into your field of vision. Each eye is carefully and accurately charted, but this is time-consuming and usually part of a very complete ophthalmoscopic examination.

Concerning the physical aspects of peripheral vision, let's begin with the innermost layer of the

eye that contains the light sensitive receptors. This is the retina and it compares with the film in the back of your camera. The images we view are focused on this film at a central point called the foveal or focusing spot. It's interesting to note that the area where the optic nerve enters the back of the eye contains no retina. If the nerve entered the eye centrally, the result would be a large blind area in the focusing spot. Fortunately, nature has provided that the nerve enter off center, low and to the side.

In the retina, we have certain visual receptors known as rods and cones. The cones are more receptive to colors and are used primarily for daylight vision. The rods, being more sensitive to weak light sources, pick up night vision more acutely. It so happens that the cones are more centrally placed on the retina and the rods are peripherally placed. Therefore, at night, when the pupil normally dilates in order to let more light into the eye, a larger area of the retina is automatically used, bringing more rods into play. Logically, the best night vision is peripheral vision. Some of you may recall that, during your military days, your flight surgeon told you to scan a lot with your eyes and not look directly ahead during night missions. In this way, you were relying on your peripheral vision to detect dim objects in proximity outside.

Today, the closing speeds of jet aircraft are such that the proximity of another jet is almost impossible to detect in time to take evasive action. However, we rely on our peripheral vision for other important tasks such as detecting lights and markings on final approach and landing. Good peripheral, or night vision is an essential part of our sight.

This vision actually requires a chemical action involving the breakdown of a substance contained in the rods; a substance which must be regenerated to maintain effective use of the rods. I'm sure we're all familiar with the importance of vitamin A in this respect. Sudden flashes of light cause a rapid chemical breakdown, resulting in a brief blind spell during chemical regeneration. The ability to regenerate diminishes somewhat with age, making the recovery of night vision a bit slower after a flash. The old idea of closing one eye during lightning, then opening it after the flash has some merit as far as preserving night vision is concerned. The present day cockpit lighting at night has also been devised to preserve night vision.

The use of sun glasses or helmet visors has always been highly recommended during daylight flying, especially at jet altitudes where the glare is more prevalent. This prevents the eye from becoming completely washed out, preserving it for prompt action on those half day-half night trips.

It is not recommended, however, that sun glasses be worn while driving at night, since good contrast vision is needed. If you find yourself temporarily blinded by on-coming headlights, slow down immediately, allow a few seconds for regeneration of those night vision chemicals, and you're on your way again.

The complexities of peripheral or night vision and, indeed, of sight in general naturally go far beyond what we have described. We're sure of your interest in matters pertaining to this important subject, and so we encourage you to discuss any questions you may have with your flight surgeon.

—The Flight Deck

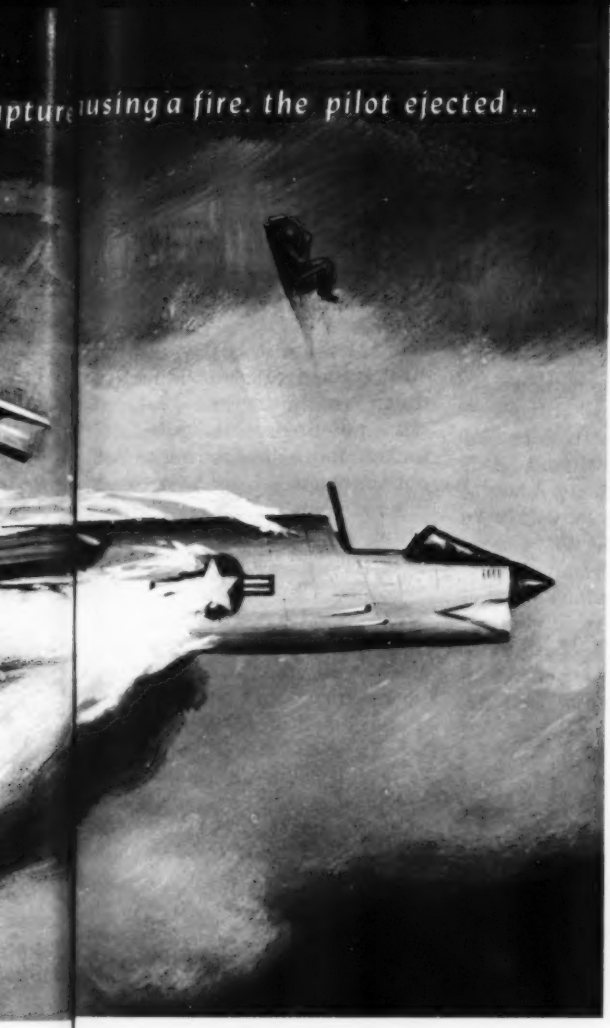
during a trans-Pacific flight aerial refueling, an F8E's main fuel cell rupture

THROUGH a SHEET of FLAME

Even through the canopy, the heat from the fire was intense. I reached up with both hands and pulled the handles. Ejection forces were surprisingly slight and when I opened my eyes it seemed as though I was still in the fire. I felt a hot searing pain on both knees and on my left arm. Finally, ever so slowly, the burning spinning *Crusader* gradually dropped away. I smelled burned hair and found out later it was my eyelashes. My visor, locked down tightly, undoubtedly saved my eyes.

The seat started to corkscrew rapidly so I threw out one arm and then a foot. This stopped the oscillations. The bailout bottle worked fine and my mask was still on. Just as I located the emergency seat release, the automatic barostat functioned and the chute opened with a surprising shock. I took off my oxygen mask and leg straps and dropped them. An F-8E flew by. I waved to let him know everything was as good as could be expected. I stopped the chute's oscillations by pulling the risers.

Preparing for the water landing coming up, I undid my left seat pack rocket fitting, allowing the seat pack to drop to my right side. I tried to connect the pararaft lanyard to my torso harness but the lanyard was buried inside the pack. I opened the pack, found the lanyard and attached it to the lower left torso harness rocket jet fitting (*Lower right is recommended.—Ed.*), and pulled out the raft and clutched it firmly under my left arm.



I entered the lower cloud deck and a few seconds later spotted the whitecaps. Fairly high swells and a wind of 12 to 15 knots meant that it was imperative to get out of the chute immediately on touchdown. I put my hands on the upper rocket jet fittings and as my feet hit, I released both. The chute took off at a rapid rate. I inflated my Mk3C life preserver and then inflated and boarded the pararaft.

In crawling aboard, I somehow ripped a small hole in the raft – probably with my survival knife. This didn't do much to ease the situation. I inventoried my survival gear, counted arms and legs and mentally prepared myself for at least an overnight water voyage such as we had been briefed for back in the ready room. The raft was pitching pretty strongly and the possibility of being turned over was apparent. So was the possibility of seasickness. I deployed the sea anchor and seat pan for drag.

I loaded my .38 revolver with tracers (*Preloading is a good idea.–Ed.*) and got out a distress signal flare and a dye marker packet and tied them to my helmet strap. In about 20 minutes I spotted a destroyer less than a mile away. Incredulously, though I knew a vessel was stationed just abeam of ARCP No. 1, and still not really believing my eyes, I got out the signal equipment. With dye marker I immediately turned the entire general area a bright emerald green. I lit up a daysmoke distress signal and even fired off five tracer rounds. I blew my whistle for my own psychological benefit.

As the destroyer pulled slowly closer, a KC-130F tanker flew by. Later an SAR amphibian also flew by. I believe both aircraft were able to spot the life raft.

The seas were such that a whaleboat was lowered to recover me. In all I was in the water about 20 minutes and in the raft 20 minutes before being rescued. (Water temperature was reported to be about 64° F.)

Everything in my survival equipment functioned perfectly. The helmet visor, as I've said before, certainly saved my eyes and face, and the leather gloves and flight suit sleeves greatly reduced the severity of the burns as I pulled and held the face curtain. I had third degree skin burns under my flight suit but the suit didn't even scorch. It had never been laundered. The backs of my gloves were deeply burned when I pulled the face curtain but my hands were all right. My only injuries were minor burns: a burned neck where I wasn't protected by my oxygen mask, flight suit or scarf, and burned kneecaps and left forearm. My APH-5 helmet was cracked above the left Sierra fitting – damage probably sustained during the aircraft spin. The silk scarf which I was wearing around my neck was extensively burned and probably provided some protection.

As a postscript, from talking with the ship's crew that rescued me, I learned that they saw and heard an explosion, then saw black smoke just at the base of the overcast. This was apparently the *Crusader* blowing up. The ship steamed by the debris on downwind where they found me less than 1000 yards away.

TIME LAG

notes from
your flight surgeon

THE relationship of speed and the human limitations of visual and muscle reaction time to mid-air collisions is a familiar problem. Something of the same nature exists in voice communication in the A-4. Ingredients are the speaker's reaction time, the slight communication transmission delay inherent in the design of the aircraft radio system and the hearer's reaction time. Take the following case . . .

On leg seven of an authorized sandblower hop, two A-4Bs were flying at high speed in bright sunshine over glassy calm water. The chase pilot saw the lead plane heading toward the water. Approximately a second later he called, "Bob, watch out!" then continued, "You hit the water." During the short dwell period between these transmissions, the lead plane struck the water with his wing tanks and pulled up. (The lead pilot had shifted his attention from visual monitoring of the flight to check his maps. When he had looked back up, he saw he was getting extremely low and pulled back on the stick. At that moment he had felt a very slight thump as if he had hit something.) A visual check at altitude showed very little damage. The flight continued to base and landed.

Besides the obvious caution against the hypnotizing effect of smooth water, the chase pilot recommends that whenever a chase pilot observes the lead aircraft start down when at 200 to 300 feet, *call out*.

"When talking on radio," he cautions, "take into consideration the lag in time required to transmit. In this case I don't think the first part of my message warning the lead pilot of impending contact with the water was heard. I think it is possible for an aircraft to go from 200 feet to the ground in the time it takes a chase pilot to press the mike button and for the transmitter to put out on the air."

Shrouds

A QUICK-THINKING helicopter pilot and crewman rescued a pilot who was having great difficulty with parachute shroudline entanglement.

The pilot had successfully ejected and had disconnected both shoulder rocket jet fittings on hitting the water. As he swam away from the chute he became entangled in the shroudlines and risers. He delayed inflating his Mk3C at first but then "went for the toggles." The sea state caused him to swamp in the shroudlines. In his efforts to stay clear of the chute he failed to pull the right toggle of his life preserver.

By now, he had managed to cut most of the shroudlines with his survival knife or work them loose except for a few around his left leg. The chute sank directly below him and the lines worked down until they were wrapped tightly around his ankle.

"I became very fatigued trying to submerge to cut the lines loose and was swallowing a great deal of water," he later reported. "Nearing complete exhaustion with about 5 to 10 lines remaining, I tried to motion to the helo which had been waiting for me to clear the chute before pulling me out of the water."

The helo crewman lowered the rescue seat and the survivor got on it. He was raised until the chute neared the surface; then the hoist was stopped for him to cut the remaining lines. The chute began to billow and the pilot was lowered to water level to finish cutting. With only a few lines remaining the helo lifted the pilot out of the water and began moving forward slightly. When he was free the pilot was hoisted into the helo and taken aboard ship.

The pilot states the success of the rescue was "mainly due to quick thinking on the part of the helo pilot and his crewman."

Without Sleep

PILOTS have been given lectures repeatedly concerning fatigue and its effects yet they continue to fly in spite of it. The very same pilot who worries about one anti-histamine tablet or dexedrine tablet doesn't even hesitate when it comes to flying with inadequate sleep.

—Flight Surgeon in MOR

Aloha

THE pilot wore a red and white aloha shirt and tan walking shorts underneath his summer flight suit. Once on the ground after ejection and parachute descent, he released himself from his parachute, removed his torso harness and took off his flight suit before walking out from his landing site. This probably contributed to his delayed rescue. Rescue personnel were looking for a downed pilot in an orange flight suit—*not* for one so informally attired.

—Flight Surgeon in MOR

Dry Run

AFTER an F-8E accident on takeoff, the pilot exited the cockpit quickly and easily, thanks to thorough emergency procedures training. He was wearing a full pressure suit. The investigating flight surgeon made the following comments in his report:

"This pilot, as well as all of his squadron mates, has undergone a dry run in the F-8 cockpit quarterly since joining the squadron. The pilot noted that on his last dry run, it was specifically pointed out that the seat pan-to-console oxygen-communications connection tended to bind unless pulled straight up and might prevent egress from the cockpit unless it were disconnected before egress was attempted. He remembered this and performed his egress correctly and expeditiously – a fact which might have saved his life had the fire followed the accident. This speaks volumes for the value of such squadron level training."
(Evidently this squadron has read and is complying with OpNavInst 3740.3B, para 7c. How are you fixed for Admat?—Ed.)

Wringing Out the Bird

An A-1H pilot performing unbriefed acrobatic maneuvers at an altitude far below the recommended minimum crashed into the water. He was not wearing an anti-G suit because the type flight briefed did not require it according to squadron regulations.

The lead pilot was wearing his anti-G suit—he had acquired the habit of wearing it on all flights. He stated that the G-forces during the acrobatic maneuvers caused him to strain and tense his stomach muscles even though he was wearing an

anti-G suit. In spite of this, he still noted a slight fuzziness of peripheral vision in two or three instances. He felt that he was pulling about 5 G. (The accelerometer which he had failed to set on zero prior to takeoff registered 6 G after the flight.)

While noting that individuals vary in G tolerance, the investigating flight surgeon points out that if the G forces were sufficient to cause these symptoms in a pilot wearing an anti-G suit, they probably would cause gray-out, blackout and possibly unconsciousness in a pilot without this added protection. G tolerance, he points out, diminishes with each maneuver and the wingman's tolerance is suspected to have decreased after 20 minutes of acrobatics. The maneuver on which the accident occurred was the most prolonged of the flight and carried the highest G load. As the AAR states, "It is highly probable that the wingman blacked out."

This accident raises the question of the advisability of wearing anti-G suits on all flights in this model aircraft. An anti-G suit probably would have prevented this accident but this cannot be used as a criterion since acrobatics on this flight were against squadron regulations. There is always the possibility, however, of an abrupt maneuver arising which cannot be foreseen during the briefing. An anti-G suit can be uncomfortable on a prolonged flight but the discomfort is not sufficient to countermand its use when it could possibly be lifesaving.*

*It is considered that as senior member of the section that the lead pilot exercised poor judgement in consenting to the proposal of a tail chase and erred in carrying acrobatic maneuvers far below the 5000 feet minimum recommended by NATOPS.

Since this accident, anti-G suits have been made mandatory items of flight clothing for all A-1H flights in the squadron except when the requirement is specifically waived by the CO. It is contemplated that this waiver will be executed only for flights such as long low-levels in hot weather during which the discomfort and possible debilitating effects are overriding considerations. — Flight Surgeon

Waxed Paper String

DURING a recent NASC accident investigation, it was found that the survival items in the emergency equipment package were secured with a waxed paper string instead of the required shroudline. This string would not have lasted long in salt water, and most of the pilot's personal survival equipment would have been lost.

How's your survival equipment quality control program?

Human Factor

ON the last operating day of a two-week deployment, three ordnancemen were unloading an Aero 8A-1 practice bomb container loaded with three Mk 106 Mod 2 practice bombs. Desire to secure and "leave this place" overcame safety precautions and common sense when they decided to speed things up by catching the ejected bombs in a foul weather jacket. Two men stood beside the container, one on each side, holding the jacket beneath the forward bomb bay.

The third man, standing on the port side of the container, actuated the release mechanism for the forward port bomb ejector. When released, the Mk 106 hit the jacket, was deflected, and struck the concrete ramp. The signal charge fired on impact with the ramp and the blast struck and injured the ordnanceman standing by the port side of the container.

Investigation disclosed that two members of this same crew had previously unloaded another aircraft that afternoon by this method.

Take It With You

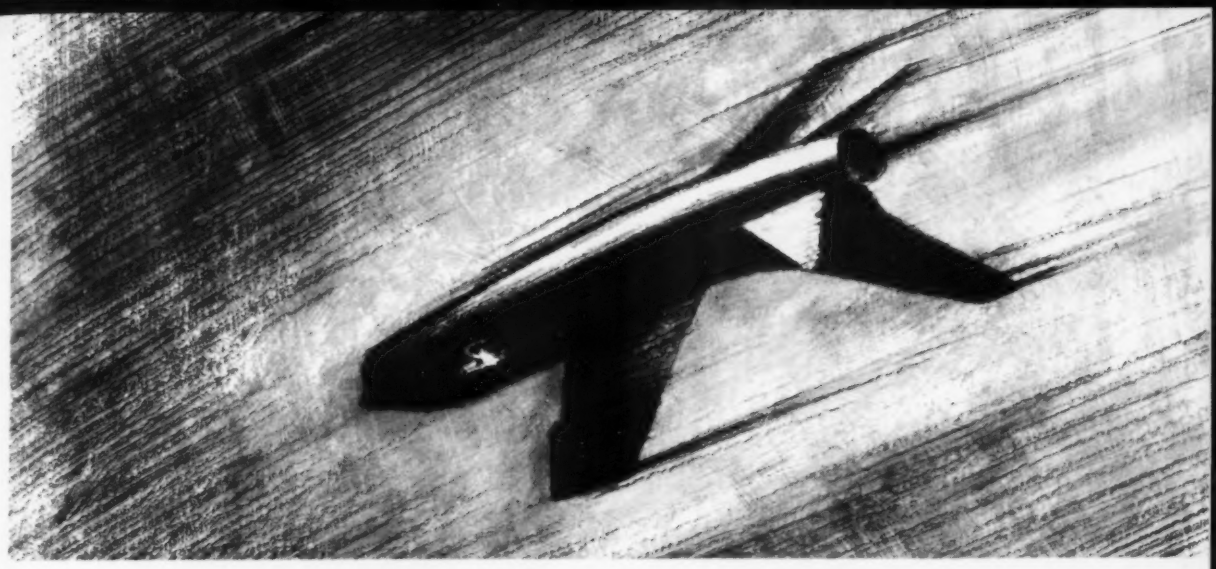
Pilot. . .The aircraft struck the water and stopped at once. I considered getting out with my parachute on; however, I knew I would be picked up at once and would not need the raft. I unstrapped, climbed out on the port wing and jumped in the water. Once in the water, I inflated my life vest and swam away. The helo was overhead and lowered the hook. I swam a short distance to the hook and was raised into the helicopter...

"Picked up at once." There can be many a slip between sighting the survivor and getting him safely aboard the helo or boat as NASC's records can show. And what about the cases in which life vests could not be inflated because of missing CO_2 cylinders, cylinder container caps not screwed down, etc.? In other words, *never* count on speedy rescue. Wherever possible, take your raft and survival gear with you. Don't survive an ejection or ditching only to lose out in the pre-rescue phase.

Bet Your Life?

"When carrying passengers, I always ask if they are familiar with their emergency equipment and bailout procedures. And upon receiving the usually glib 'yes,' I ask if they will bet their lives on it. This usually results in a more thorough checkout."

—USCG Flight Safety Bulletin



A LITTLE VERTIGO

All pilots should be aware of the possibility of vertigo when operating SIF/TACAN/UHF/OMNI control boxes on side consoles. This vertigo is your body's response to coriolis acceleration When your body is in rotation with the aircraft and you move your head voluntarily out of the plane of rotation, severe vertigo can result. The motion is strongest when your head movement is at right angles to the plane of rotation — for instance, in a climbing turn as you look down and back to change channels.

This was the case in an F8B strike in which the pilot, believing himself inverted and in a spin, ejected. Here's how it happened:

In the holding pattern after a cross country flight, the pilot noticed his gyro-horizon light was out. He did not have a serviceable flashlight in the cockpit and did not use the aircraft's portable cockpit light. He entered a thin overcast with the rotating beacon and external lights on, in itself a situation conducive to vertigo. While in the overcast he was told to descend to 3300 feet, slow to approach speed and turn right. He rogered and asked if *they* wanted a cockpit check.

"Just as I was in transition," the pilot states, "They told me to contact GCA on the same frequency. I bent my head back to look at the right panel."

At this point the pilot experienced vertigo.

His attitude gyro showed 30-degree right bank but he couldn't believe it. Thinking he was inverted, he pressed the mike.

"I'm having trouble here," he reported. "I've got a little vertigo."

A witness on the ground saw aircraft through the overcast at this time — a figure 8, port to starboard rolling, a 70-degree roll to port, then back to level flight 5-degree nose-down. The pilot later stated he had felt as if the aircraft pitched to starboard just before he ejected between 500 and 1000 feet above terrain. Investigators concluded from the aircraft wreckage that the plane had been in nearly level flight and *not* in a starboard roll at the time of ejection.

Many a pilot changes channels and SIF code immediately when instructed to do so regardless of the attitude or the maneuver in which he is involved at the time. Perhaps this action is more instinct than intention, a habit from student days. When his flight instructor told him to do something, he did it, there and then, no "ifs, ands or buts" or "wait ones."

Don't make this sometimes fatal mistake. Remember it won't do much good to change channels or SIF code if you are going to induce vertigo — you won't need either if you are in a spin. Complete control of the aircraft by the pilot is always paramount and controllers understand this. Do not hesitate to delay a channel change or an SIF code change if you feel you must not take your scan from your flight instruments at a particular moment.

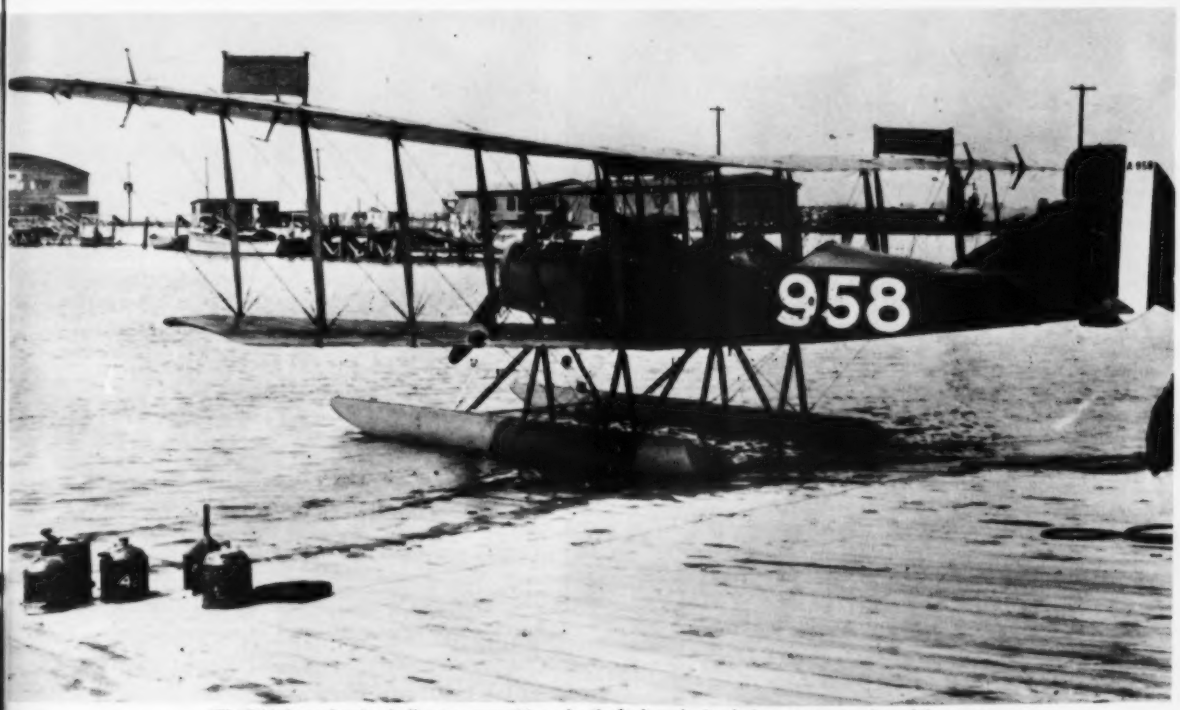
A *wait one* transmission is a much more welcome reply than the receipt of the crash alarm.

Safety Orders

for mechanicians

Eyeball these for application today — you'll be surprised how valid they are even now. From these scant beginnings came our present SOP — rule by rule the volume grew. Each rule gained by experience of teams past and recorded for the teams of the future.

Safety Orders and Regulations Pertaining to the Flying School at United States Naval Aeronautic Station (Pensacola about 1915)



"The chief mechanic shall note quantities of oil, fuel and circulating water on board."

Procedure Before Flight

(1) The chief mechanician will make a careful inspection, in the approved manner, of all accessible parts of the aeroplane's power plant, controls with their leads, and instruments and equipment; also note quantities of oil, fuel, and circulating water on board, and see that pontoons are free from water and that drain plugs and hand hole plates are properly secured.

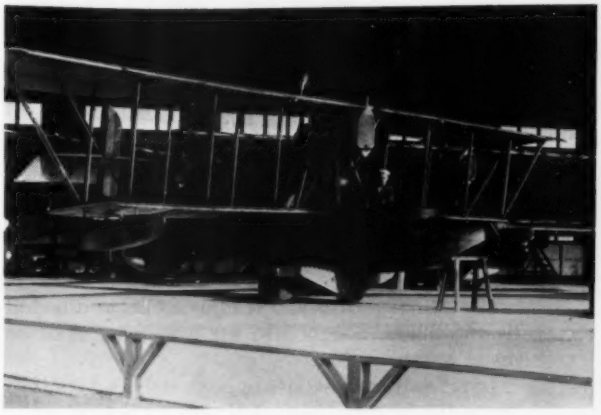
(2) The second mechanician shall make a careful inspection, in the approved manner, of all accessible parts of the aeroplane's structure.

(3) Any unusual condition noted in the above inspection shall be referred to the pilot about to make the flight, no matter how unimportant that condition may seem.

(4) Special care shall be taken that all loose tools or other loose articles are removed from all parts of the aeroplane before motor is started.

(5) When inspections are completed and all is found satisfactory, the chief mechanician shall report "Ready" to the pilot about to make the flight, notifying him as to quantities of fuel, oil and water on board, condition of starter, fire extinguisher and other equipment.

(6) After the motor has been started and all

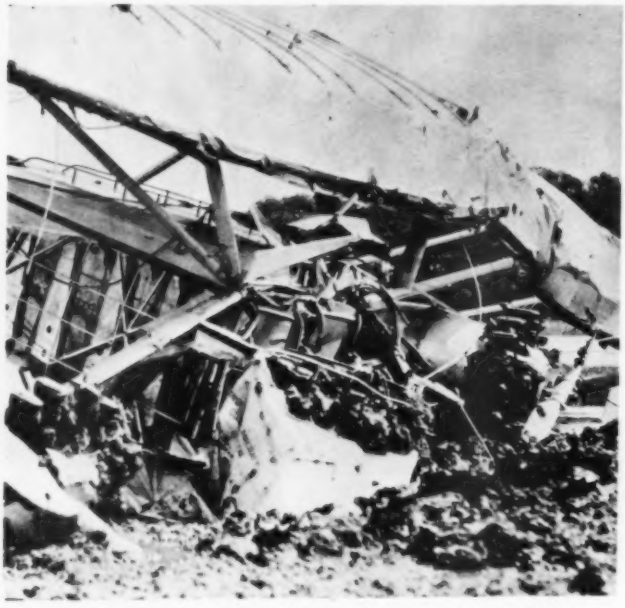


The second mechanician shall make a careful inspection of all accessible parts of the aeroplane's structure.

men of the crew are stationed as directed by the chief mechanician, he shall hold up his right hand as a signal to the pilot "All Clear."

(7) Before aeroplane leaves runway note if pilot and passenger have adjusted their safety straps, and if either one has not done so invite his attention to the fact.

(8) In aeroplanes that are capable of carrying a passenger, the chief mechanician shall be taken



Any unusual condition noted will be referred to the pilot.

Loose tools or other articles shall be removed before the engine is started.

on the first flight each day for observation of its behavior in the air, with special reference to the power plant operation. The other members of the crew shall be given flights as often as convenient.

Procedure After Flight

(1) Upon return of the aeroplane to the runway, the inspections specified in paragraphs 1 and 2 of "Procedure Before Flight" shall be repeated. In addition, the pontoon shall be carefully examined for indications of leaks or damages that may result in leaks.

(2) Fuel, oil, and water shall be replenished as required.

(3) Minor repairs and readjustments as directed by the officer assigned to the aeroplane shall be made and recorded.

(4) See that valve stems, push rods and controls are well lubricated, especially after a long flight.

(5) Upon completion of the aeroplane's last flight for the day, in addition to the above, the aeroplane shall be carefully cleaned and dried down; oil, grease, and finger marks removed from fabric and varnished woodwork washed with soap and fresh water or with the approved cleaning compound – care being taken to wash off all soap; treat bare metal parts with oil or vaseline as specified, being careful not to get any of it on the fabric or other parts where not required. Put on motor cover and see that vents in oil and fuel system are closed; open hand hole plates and allow interior of pontoon to dry.

(6) After each 5 hours' flight drain the oil out of the crankcase and give the motor the kerosene treatment as specified for its type; put in fresh supply of oil.

Morning Routine

(1) Dust off all parts of aeroplane thoroughly before removing motor cover and vent covers.

(2) Check up valve timing and interrupter gap, adjusting to specified clearance if necessary.

(3) Check up propeller lock nut adjustment and readjust if necessary.

(4) Make a careful examination for indications of leaks overnight in fuel, oil, and water service.

(5) Make careful examination for development of rust on wires and fittings; where this is found the rust shall be scraped off to bare metal and a coating of vaseline applied.

(6) Carry out the provisions of paragraphs 1, 2 and 4 of "Procedures Before Flight."

(7) See all clear for turning over motor; start motor and allow it to idle for at least five minutes and until cylinders are warmed up, then very gradually increase to full speed; note operation of motor, readjusting carburetor to specified adjustment if necessary; when motor runs properly at all speeds, report to the officer to whom the aeroplane is assigned that it is ready for service.

General Rules

(1) Attention of all mechanicians is called to the fact that their duties in connection with aeroplanes and power plants is fully as important as regards efficiency and safety in flight as the duties of the pilot. Inspections before and after flight shall always be made in accordance with the prescribed Inspection Routine for the types of power plant and aeroplane concerned.

(2) Chief mechanicians shall see that the rule is strictly enforced that no members of the crew shall engage in any occupation or conversation not directly connected with the work on the aeroplane during the inspections before and after flight and during morning routine.

(3) No mechanician shall smoke while engaged in work on an aeroplane.

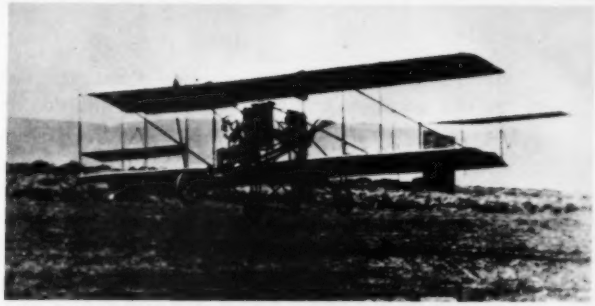
(4) Gasoline shall be stowed only in the authorized receptacles and in specified localities; these receptables shall be kept closed tight when not in use.

(5) Smoking inside hangars is prohibited.

(6) None other than the specified adjustments of any part of the aeroplane or the power plant shall be made unless authorized by proper authority; all changes of adjustments will be recorded in the work report (N. A. O. NO. 4).

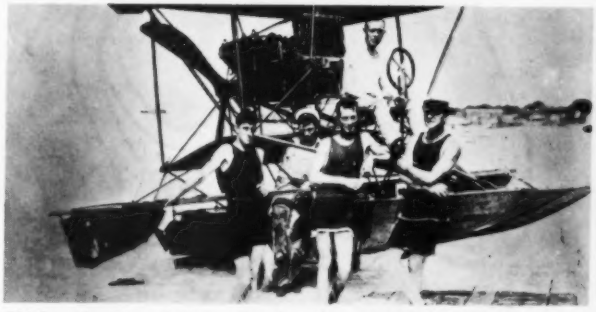
(7) Mechanicians shall not make any private collection of tools or spare parts for use in effecting repairs. Only such wire, bolts, nuts, cotter pins and other material that is issued from stock shall be used for replacements in any part of the aeroplane or power plant. Cotter pins or safety wires shall never be used more than once.

(8) Mechanicians will not touch any part of an aeroplane or its equipment to which they are not assigned without the consent of the chief mechanician in charge of it.



Before the aeroplane leaves the runway advise the pilot and passenger to tighten their safety straps.

Gasoline shall be stowed only in the authorized receptacles.



Chief mechanician shall see that the rule is strictly enforced. . .

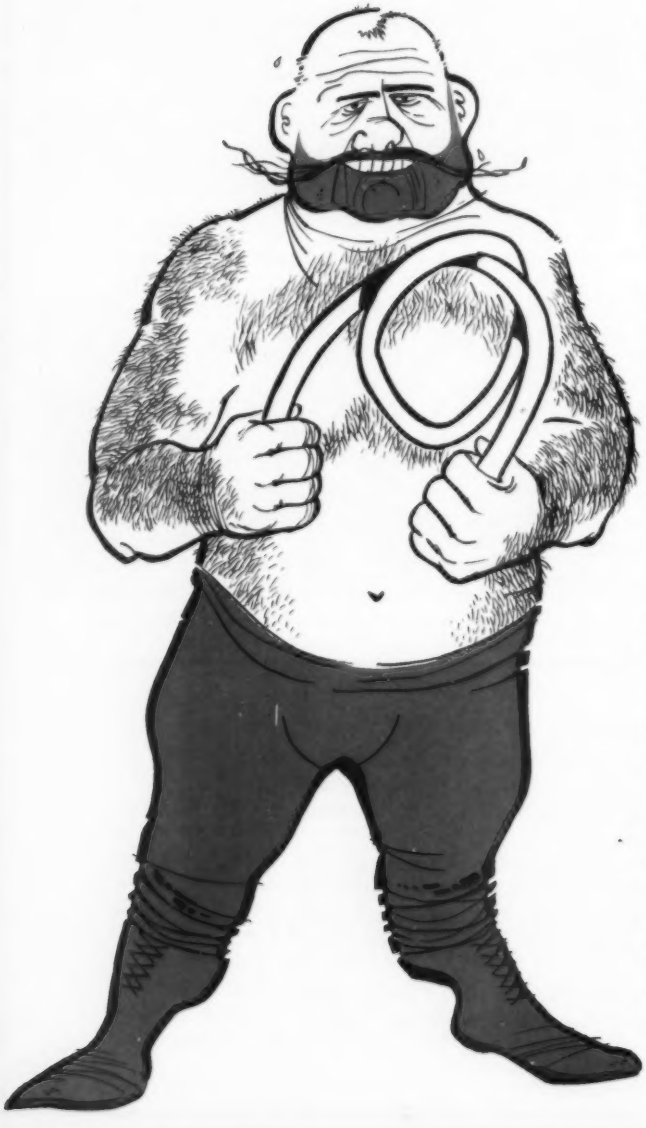
Warning

Point Arguello, California, as you are probably well aware, is the site of a USAF Missile Facility. This busy activity has favored us with the following item, taken from a sign attached to one of the electronic machines at the tracking and launch base:

"Das computenmachine is nicht fur gerfingerpoken und mittengraben. Is easy schnappen der springenwerk, blowenfusen und poppencorken mist spittzensparken. Ist nicht fur gewerken by das dummkopfen. Das rubbernecken sightseeren keepen hands in das pockets. Relaxen and watch das blinkenlights."

For those who are not experts in fractured German, it means. "This is delicate equipment, don't touch." It works.—*All Hands, 11-63*

Fluid Hoses Rate Better Treatment



Flexible fluid hose lines on jet engines probably take more of a beating than any other part. They are twisted, crimped, pulled, and chafed. With proper care and maintenance the hoses will have a long life but mistreatment spells their doom.

Most modern hoses are made of teflon plastic. Teflon is compounded from a tetrafluoroethylene resin and is processed under extremely critical conditions. To make the hose, the compound is extruded in tube shape of the desired size. Stainless steel wire is braided over the outside to provide strength and protection. This hose material is chemically inert and is unaffected by fluids normally used in jet engines. The operating temperatures may range from – 65°F to 450°F.

Although the hoses perform well in their specified functions, they are not super hoses. In fact, certain peculiarities demand understanding and attention. Maintenance inspection of hose lines should be conducted at the specified periods. Hose lines should be given a visual inspection for leakage, abrasion, and crimping.

All hose lines with swaged fittings showing leakage from the hose body or from the fittings should be replaced. If the fittings are of the reusable type and leakage is at the point of connection of the fitting to the hose, tighten the fitting and inspect again for leakage. If the leakage is from the hose, it may be replaced when the fittings are the reusable type. Follow the recommended procedures shown in applicable technical publications.

The hoses should be inspected for abrasion or broken wires. Random broken wires are acceptable; however, if excessive wire breakage, either general or localized as a result of abrasion, is found, the hose should be replaced in accordance with technical publication limits.

Crimps or buckles are not acceptable in high-pressure hose (above 150 psig operating pressure). A crimp or buckle is an abrupt change in contour of the teflon liner, caused by bending the hose assembly to a smaller radius than the normal flexibility of the line will allow. This condition is similar to that which occurs when a cardboard tube is bent. When the hose is straightened, the collasped area will expand but the change in contour will remain. This condition is applicable only to the liner and will not affect the metal braid; however, the condition can be detected without removal of the metal braid. Passing a steel ball of

Hose Size	Ball Size
-4	5/64 inch
-5	9/64 inch
-6	13/64 inch
-8	9/32 inch
-10	3/8 inch
-12	1/2 inch
-16	47/64 inch
-20	61/64 inch

correct size shown below through a hose suspected of being crimped will help to confirm the suspicion.

Use care when removing installed hose lines. To remove AN-MS flared and flareless connections, apply one wrench to the swivel nut, sometimes called B-nuts, and another wrench to the hex nut on the nipple portion of the hose fitting. Turn the B-nut to loosen and remove the hose line, as shown in figure 1. For flange connections, remove the nuts and pull the flange from the pad. Use care when handling flange fittings to prevent damage to the gasket, flange, sealing face, pad, or fitting.

The general handling of teflon hose warrants special attention. Teflon hose lines in hot fluid systems will tend to preform themselves to the installed position. Some lines for particular installations are preformed by the manufacturer. For this reason care should be exercised in handling and removing these hose lines from an installation. Bending or excessive handling will tend to crimp teflon hose lines. Do not bend or attempt to straighten preformed teflon hose lines. Do not stand on hose lines or use them for handles. Do not leave them connected to removed engine accessories as further movement of the accessories can damage the hoses.

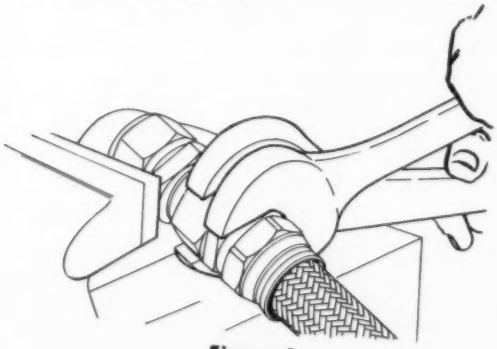


Figure 1

A suggested method of handling preformed hose lines is shown in figure 2. Tie a wire securely upon removal at the point of preform to prevent straightening or crimping of the line during subsequent handling.

The installation of these hose lines is very important. All hoses should be carefully routed and securely clamped to avoid abrasion and particularly to prevent crimping on flexing installations, see figure 3.

Hose lines should be supported at least every 24 inches. Closer supports are preferred. Flexible lines should be supported so that they will not

JSN-278

Figure 2

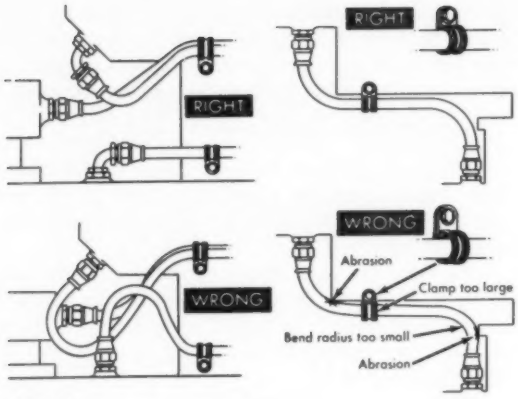


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Figure 3

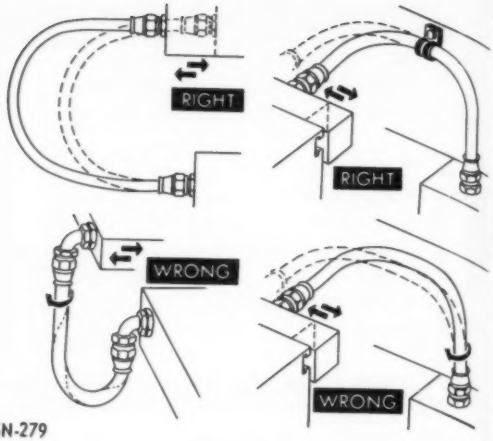

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Figure 4

cause deflection of rigid supporting lines. Hose lines between two rigid connections may have excessive motion restrained where necessary, but should never be rigidly supported. Support clamps should not restrict travel or cause the hose to be subjected to tension, torsion, compression, or shear stress during flexing cycles.

For flexing installations, the following precautions will help to prevent crimping. The hose should be bent in the same plane as the movement to avoid twisting, as shown in figure 4. Hoses flexing in two directions shall be clamped at the point where the hose changes planes. This has the effect of dividing the hose into sections, each in one plane.

Teflon hose is unaffected by fuels, lubricating oils, coolants, or solvents commonly used around aircraft. The hose is nonabsorptive and anti-adhesive and it is easily cleaned. Hose lines can be cleaned in oleum spirits, kerosene, trichloroethylene, or synthetic detergents. Flush or dip hoses in cleaning fluids and brush if necessary to dislodge deposits.

The teflon hose, like any other item of equipment used on gas turbine engines, has definite limits, which, when exceeded, may result in failure. Although teflon is tough and strong, it lacks the ability to withstand abusive handling. Therefore, as a reminder, adhere to the following rules:

- Don't exceed bend limits.
- Don't exceed twisting limits.
- Don't straighten a bent hose or set hose. Avoid bending opposite to the set plane.
- Don't hang or support objects from a hose.
- Don't stand on or lay objects on the hose.
- Don't clamp hoses near enough to other objects to cause abrasion.

—Adapted from GE Jet Service News

Boccidents

If you think it's difficult to read backwards, you're right. And it's just about as hard to drive backwards, judging from the number of reported "Backcidents" — tractors, mules, NC-5s and the like backing into airplanes.

In fact, it would seem that the longest and most expensive line between two points is the shortcut called the backing approach — it extends all the way from the flight line to the junk yard.

By the way, you can read this printing quite clearly in a mirror. While you're at it, try holding a mirror up to the driving practices around your outfit. Might prove quite interesting — and it sure beats hindsight!

WELL DONE

Erratic Gyro Detection

The long standing and as yet uncorrected high failure rate of the AJB-3 in F-4B airplanes poses a problem to operators. VF-74 assigns an electrical troubleshooter the task of monitoring gyros in addition to his other postflight responsibilities. This procedure paid off recently when Howard D. Sadler, AE3 discovered and reported such a discrepancy during a night turnaround aboard FORRESTAL. When external power was applied for refueling and postflight check Sadler noted the AJB-3 was not erecting properly and promptly "downed" the airplane. In doing so he possibly averted a night launching accident . . . Approach salutes H. D Sadler for his professional performance.

WHY IS IT? WHEN WILBORE WANTS YOUR AIRPLANE FOR A CROSS-COUNTRY... EVERYTHING, BUT EVERYTHING DURING THE NEXT 32.9- HOUR FLAP OVER THE HINTERLANDS IS NOTHING BUT UP...

BUT WHEN HE GETS BACK TO HOMEPLATE WE WONDER HOW OUR HERO IN THE AL-CLAD CHARIOT EVER MADE IT. DOWN GRIPES WILBORE WRITES GO LIKE THIS: ARC-27 ON #1 OUT. ARC-27 ON #2 OUT, APN OUT, VGI BLEW 3 FUSES, INT LIGHTS OUT, EXT LIGHTS IN, OIL LEAKS, AUTOPILOT OUT, COMPASS OUT, ENG. N.G. ETC. ETC. ...

Spark Plug FOULING and DURABILITY

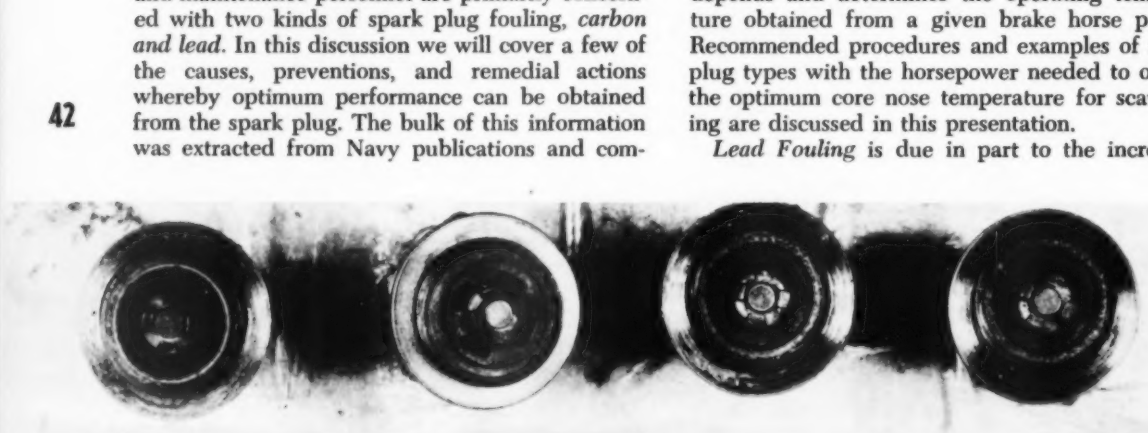
Vincent P. Ruscilli, West Team

Wright Aeronautical Division

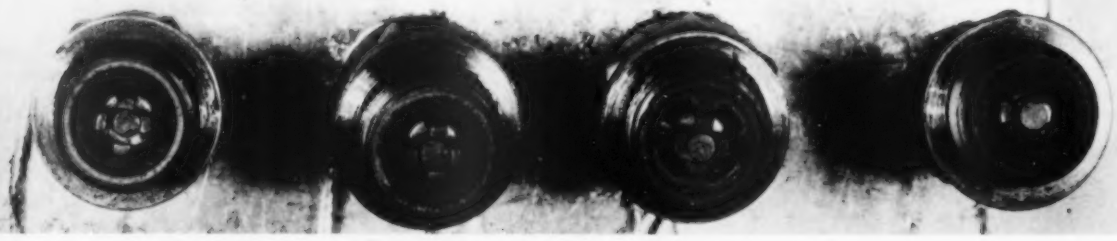
The maximum operating reliability of the reciprocating aircraft engine depends to a large degree on efficient performance of the spark plugs. Spark plug fouling presents a definite problem and can result in costly spark plug removals, reduced aircraft availability, and more important is the adverse effect on the optimum performance required for safety of flight. R-3350 engine flight and maintenance personnel are primarily concerned with two kinds of spark plug fouling, *carbon and lead*. In this discussion we will cover a few of the causes, preventions, and remedial actions whereby optimum performance can be obtained from the spark plug. The bulk of this information was extracted from Navy publications and compiled by the Wright Engineering Operations Team assigned to ComNavAirLant by BuWeps.

The best spark plug core nose temperature is 1000°F for scavenging carbon deposits and oxide to high resistance oxy-bromides. This is the perfect temperature for optimum clean-out whether flying or ground running. The design spark plug rating is the factor on which core nose temperature depends and determines the operating temperature obtained from a given brake horse power. Recommended procedures and examples of spark plug types with the horsepower needed to obtain the optimum core nose temperature for scavenging are discussed in this presentation.

Lead Fouling is due in part to the increased



LEAD DEPOSITS — Caused fouling of these eight spark plugs in a single-engined aircraft, loss of engine power and finally, loss of the aircraft. Proper operational techniques can prevent this happening to you. Here's how:



quantity of tetraethyl lead used in present day high performance fuels. The additive is needed to increase the fuel's ability to resist detonation. This increased lead content sets the stage for spark plug fouling due to the highly conductive deposit left on the spark plug ceramic insulator during the combustion process.

This deposit is the residue from the ethylene dibromide (EDB) and tetraethyl lead (TEL) in the fuel. EDB is the scavenging agent which reacts chemically with TEL during the combustion cycle to form lead bromide (volatile lead) which should pass out the cylinder with the exhaust gases. Unfortunately, this scavenging process is not perfect and lead salts such as lead oxide and lead sulphate are formed. This lead salt build-up on the spark plug core is normally incurred in flight during prolonged low cruise power settings in a manual lean environment. It is therefore of utmost importance that the pilot utilize the brake horse power clean-out at hourly intervals to scavenge these deposits. Conversely, if he allows a progressive buildup of these deposits the fouling becomes more pronounced when cylinder head temperatures are rapidly increased following long periods of low cruise power settings.

Recommendations: *Inflight Brake Horsepower Cleanout.* This procedure should be conducted when operating for prolonged periods in a *lean* condition with low cruise powers. The interval for this cleanout should be 3-5 minutes for each hour in this environment. BHP required to obtain the scavenging core nose temperature (1000°F) of the spark plug will vary with the design rating of the spark plug, spark timing, CHT and mixture strength. The following recommended procedures with spark plug type and engine models are quoted as examples: (Caution should be exercised not to exceed engine operating limits.)

AC-286A R3350-34/42/32WA/36WA
Mixture AUTO RICH and spark advance
Set any RPM/BMEP and torque pressure combination to obtain 1550 bhp.

RHB-32N R3350-32WA/36WA
Mixture AUTO RICH and spark advance
Set any RPM/BMEP or torque pressure combination to obtain 1340 bhp.

AC-281W R3350-26WA/B/C/D
Mixture AUTO RICH – spark retard (28°F)
Set any RPM/Torque pressure combination to obtain 1340 bhp.

Note: When flying *at or above* the brake horsepower required for scavenging, the cleanout is not necessary.

Carbon fouling is a condition generally encountered during prolonged holding periods on the ground in the idle range . . . ***rich idle mixtures*** will form a considerable carbon deposit in the combustion chamber and has caused many aborted takeoffs and spark plugs removals . . . . the core nose temperature of the spark plug is normally 450°F in the idle range and since temperatures above 800°F are needed on the plug core nose to scavenge these carbonaceous deposits, the importance of proper idle mixtures cannot be overemphasized. Carbonaceous fouled spark plugs have been known to pass the magneto check at field barometric (approximately 30" MAP) but when subject to takeoff powers of 55" to 60" MAP a high pressure breakdown and brake horsepower loss occurs when optimum performance is an important requirement.

Note: If high power is *applied rapidly* with heavy carbon deposits on the spark plugs a concurrent rapid heat change takes place across the ceramic insulator tip. This will cause carbon deposits to react chemically with the lead salt deposits to form molten lead which can spread across the insulator tip and temporarily short out the spark plug.

Recommendations to maintenance personnel: Assuming that the ignition and engine systems are in an up status the following procedures should be performed seasonally or when the requirement dictates at the home base of operations.

Idle Mixture Check:

a. CHT must be at 150°C (min.)
c. Momentarily energize primer and check for:
(1) RPM increase (0-50)
or
(2) If RPM decreases, then slowly move the mixture toward IDLE CUTOFF.

A subsequent increase in excess of 25 rpm indicates too rich a setting. (This rich setting requires the pilot or engineer to hand lean to 25 rpm drop from test power during idle operations to prevent excessive carbon build-up on the spark plugs).

Idle Mixture Adjustment: (Seasonally – when required)

a. Ensure the proper "idle RPM" is set.

b. Set the throttle to obtain 1000 rpm at best power condition. This will be obtained by alternately adjusting the idle mixture adjustment lock screw and the throttle to obtain the lowest MAP at 1000 rpm.

c. Turn the idle mixture adjustment lock screw on the carburetor counter clockwise (lean) until engine speed drops to 875 rpm.

d. Recheck the mixture as outlined above. (Idle Mixture Check).

e. If ambient temperatures vary with a consistency of 20°F or more from cool-of-day to heat-of-day, the mixture should be set with the temperature conditions . . (example)

(1) If adjustment is made during heat-of-day set mixture at best power. (para. b.) This setting will compensate for itself when the ambient temperature cools and the density changes the fuel/air ratio to a lean-of-best-power mixture.

Note: The above recommended mixture adjustment places the engine in an antifouling or as normally referred to a "low power burn-out" environment in the idle range. This fuel/air ratio mixture now contains sufficient excess oxygen to burn off accumulated deposits of oil and prevents a build-up of carbon deposits.

Ground Operations Spark Plug Cleanout Procedures. For every 15 minutes of prolonged ground idle operation a brake horsepower cleanout is recommended. If awaiting takeoff one minute or 200°C (CHT) whichever comes first is essential to ensure optimum spark plug performance. The BHP required to obtain the core nose scavenging temperature (1000°F) will vary with the spark plug rating. Examples:

AC-286A: Set any RPM/BMEP or torque pressure combination to obtain 1550 BHP. Note: If a governing propeller restriction exists, such as the P-2 aircraft between 2000 to 2400 rpm, utilize the procedure in the Flight Manual with propeller in full increase set 2400 rpm for clean out.

RHP-32N: Set any RPM/BMEP or torque pressure combination to obtain 1340 BHP.

AC-281W: A-1 aircraft. R3350-26WA/B/C/D – set any RPM/Torque pressure combination to obtain 1340 BHP. If danger of aircraft control exists utilize the field barometric power check to increase the temperature of spark plug core nose.

Summary: The information that has been presented to assist the flight and maintenance personnel to obtain optimum performance from the spark plug can be condensed to three basic requirements:

- Proper idle mixture adjustments.
- Ground cleanout of the spark plugs during prolonged idle operation, especially prior to takeoff.
- Inflight cleanout when operating in a lean environment using low cruise powers.

Spark Plug Checklist

An experienced mechanic can learn as much about an engine by looking at the spark plugs as a doctor can about a patient by looking in his eyes. For instance, if a spark plug goes dead during the first few hours in service he'll suspect rough handling during installation. This will usually be confirmed by a distorted plug shell, cracked core insulation or other damage.

Carbon fouling indicates improper fuel-air mixture or excess oil consumption. A closer look at the carburetor and cylinders would determine the cause.

Orange-yellow and glazed deposits on the insulator tip and exposed metal parts indicate higher than normal temperatures due, possibly, to detonation.

An ash-grey or chalk white deposit indicates very high combustion chamber temperature thru severe detonation or pre-ignition. In this case, the free end of the side electrodes on fine wire plugs will be bluish-grey and free of any deposits. Massive electrode plugs will show some evidence of copper run-out.

The mechanic running into this should be alerted to serious trouble . . . at the very least he should inspect the affected cylinders with a boroscope or even replace them, particularly if the pilot reported backfiring.

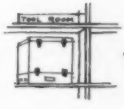
Severe detonation or pre-ignition can fail piston rings and, eventually the piston. Once the result is cured, the mechanic still must find out what induced the detonation or pre-ignition.

MURPHY'S LAW*

After 3000 feet of takeoff roll the  of an F6A received no  indication. He retarded  and began  dropped his  The tailhook engaged the  and the aircraft came to a stop about 50 feet off the runway in the 

Wheewee! 

Just before this flight the instrument panel had been removed and the static and pressure lines disconnected.

Upon reconnection the lines were  . A  was not used.

To beat Murphy's Law one should always:

(1) Use a  after reconnecting pitot and static lines

(2) Have an  verify the installation and readings.

* If an aircraft part can be installed incorrectly, someone will install it that way!

Want your safety suggestion read by nearly a quarter of a million people in naval aviation? Send your constructive suggestions to APPROACH.

Letters

The Lucky Ones

FPO, San Francisco — May I suggest that you send five copies of the October 1963 APPROACH or a reprint of the article "The Lucky Ones," on page 24 to the submarine involved. Send to: USS SEADRAGON (SSN 584), FPO, San Francisco. In addition, it is suggested that you send a copy to the man most responsible for the quick action taken by the submarine, her former commanding officer. Send to: CDR C. D. Summitt, USN, % Manager Navy Reactors, Atomic Energy Commission, Washington 25, D.C.

Incidently, when the SEADRAGON returned to Pearl Harbor from that rescue she was presented with 21 gallons of ice cream in the name of Patrol Squadron 47 and the grateful plane crew of the lost aircraft.

JOHN L. TAYLOR, CDR
AIR/SUBMARINE COORDINATOR
STAFF, COMSUBPAC

• Done and well done to the USS SEADRAGON.

—Gummy Masks

Conus — We have been using the cleaning compound recommended in the September 1963 APPROACH, page 7, to clean our oxygen masks but it leaves a gummy residue. What's wrong?

STICKY MOUSE

• After receiving similar complaints BuWeps further elaborates that cleaning with the MIL-C-18687 Type II compound (FSN 9G 7930-577-4240) is satisfactory and no residue will result when .5 to 1 part compound is used in 100 parts water and when the cleaning procedures in BACSEB 27-54 are followed.

It's Hazardous Up There!

Beeville, Texas—I am "Gear Adrift" in Notes from Your Flight Surgeon, May 1963. I would like to propose again that personnel required to work on the flight deck of a floating bird farm be paid hazardous duty pay. Being a pilot, this does not concern me directly but having been injured in a flight deck accident and having watched many more and read of many, many more in the pages of your magazine (and I'm relatively new to the game), I've come to this conclusion — It's hazardous up there ! ! ! For every pilot that I've heard of being hurt or killed, there has been at least one yellow shirt or green shirt or red or blue or brown. These boys earn that money but they just don't receive it.

I don't know if there's ever been a study made on this officially but a lot of discussion at Happy Hour and various other places, like flight deck control, reveals to me the common consensus that they are deserving. There may be some opposed to it but I haven't met any one yet.

It seems to me that this is long overdue and I hope that this may help get the ball rolling.

R. T. HECKATHORN, LT
VT-24, CHASE FIELD

• There has been much effort expended toward providing hazardous duty pay for the personnel required to work on the flight deck of our aircraft carriers; however, there is still much more to do before it can become a reality.

The Naval Aviation Safety Center has gathered and compiled statistics to support this stand and also is endeavoring to complete a carrier aviation safety survey which will further highlight this neglected area.

Thank you for your interest and desire to help the flight deck personnel.

APPROACH welcomes letters from its readers. All letters should be signed though names will be withheld on request. Address: APPROACH Editor, U. S. Naval Aviation Safety Center, NAS Norfolk, Va. Views expressed are those of the writers and do not imply endorsement by the U. S. Naval Aviation Safety Center.

Can You Top This?

MacDill AFB, Tampa, Fla, — TWELVE THOUSAND engine hours and still going without an engine removal for foreign object damage. This record was logged recently while operating the F4B.

Success is attributed to a conscientious attitude of maintenance people of the Air Force's 4453rd Combat Crew Training Squadron to prevent circumstances whereby foreign material might enter and damage an engine.

JSN

• Here's a challenge to Navy operators of the F4B to improve your FOD score in '64. If you've got a good thing going and believe you may be leaders in the field of FOD prevention, please let us know. We'll be pleased to post your score.

SAR Drop Kit

NAS, North Island—At a recent NAS North Island Safety Council meeting the subject of developing a standard P-2 and P-5 SAR drop kit was discussed. As far as I can determine APPROACH has published two articles on this subject: FAW-11 P2V

Re Flat on Your Face

NAS, Lemoore — On the subject of C-1 aircraft making nose wheel-up landings (November 1933 APPROACH) we had one here at NAS Lemoore about a year ago which is worthy of mention.

The pilot simply had passengers move aft after touchdown and the plane settled back on the tail wheel. We put extra people on the horizontal stabilizer until the nose wheel could be lowered (it was cocked in the nose wheel well and once lowered was O.K.).

I am sure more C-1 drivers are aware of this solution but the photo may be of interest.

J. H. STEWART, CDR

Kit, June, 1961, and VP-22 Drop Kit, April, 1963.

PATRON'S 31, 42 and 48 are proceeding jointly to develop a standard local VP SAR kit. Does the Safety Center have any other pertinent references or specific recommendations on this subject?

T. BANDURRAGA, JR., LCDR
ASO, PATRON 31

• The Safety Center does not have any specific material on SAR drop kits other than the two APPROACH articles you reference. Our survival people suggest that you modify these plans to meet your local operating needs. We would be interested in photographs of your kit and information on its delivery-airspeed, altitude, etc. Thank you for your letter.

A Little Recognition

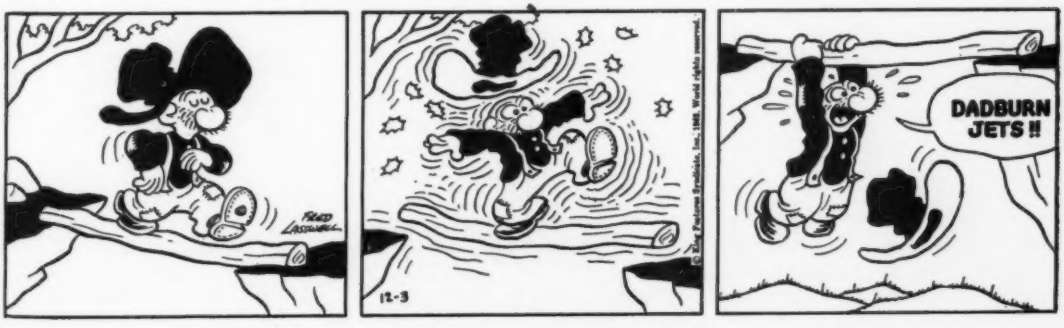
MCAS Quantico — Just a line or two from the smallest Marine Corps Air Station there is. Specifically we would like to bring to light a boring, sometimes thankless aviation safety duty that has, at our little air station, paid dividends recently. We are speaking of the Runway Wheels Watch.

In three instances since June 1963 we have had one "save" and two "possible saves" due to alert wheels watch personnel. At 1723Q, 9 June 1963 an Air Force Aero Club *Navion* was making an approach to landing when the wheels watch, PFC Aubrey F. Bryan noted that the nose gear of the aircraft was cocked. Without further ado, PFC Bryan cranked off a Very pistol flare and the pilot effected a waveoff. Tower personnel notified him of his problem, and he was able to make a nose high landing and "bounce" the nose gear straight and land without incident. In two instances, Wheels Watch personnel, to be exact, PFC Bryan again, and Pfc R. W. Pardue fired flares and waved off T-28s at night as no gear light was showing. In both of these instances there was no gear malfunction — but there could have been! In any case, for sure one aircraft was saved from damage.

The upshot of this whole thing is that wheels watch duty is a really boring, thankless task — hot in the summer, cold in the winter, and at all times a real drag. In spite of these factors, our lads proved themselves alert and plenty savvy. We feel sure that the same situation exists at all our NASs and MCASs and it is just a thought that these folks could use a little recognition. It makes a pilot feel just that much more secure when he straps his flying machine around him, to know that there's a pretty darned good ball team backing him up.

RAWLEY M. GREGORY
MAJOR USMC

• The alertness of wheels watch personnel have accounted for numerous saves. Glad to see the flag wave for these two gents.



approach

NavWeps 00-75-510 VOL. 9. NO 9.

Our product is safety, our process is education, and our profit is measured in the preservation of lives and equipment and increased mission readiness.

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Correction Notice

Page 9, January **APPROACH**, tire hydroplaning. Number 60 on left legend of the graph (Figure 1) should be 40! Our apologies to our readers, and our thanks to RADM Bob Armstrong, USN Ret., of AOPA who caught our error!

Photo & Art Credits:

Page 27 Photo Courtesy Gregory Cverko

Page 39 and 40 Photo and Diagrams, GE Jet Service News

Page 47 SNUFFY SMITH by Fred Lasswell, Courtesy King Features Syndicate

Back Cover Art by A. B. Jackson, Norfolk, Virginia

Purposes and policies: Approach, published monthly by the U. S. Naval Aviation Safety Center, is distributed to naval aeronautical organizations on the basis of 1 copy per 10 persons. It presents the most accurate information currently available on the subject of aviation accident prevention. Contents should not be considered as regulations, orders, or directives. Material extracted from mishap reports may not be construed as incriminating under Art. 31, UCMJ. **Photos:** Offical Navy or as credited. Non-naval activities are requested to contact NASC prior to reprinting Approach material. **Correspondence:** Contributions are welcome as are comments and criticisms. Views expressed in guest-written articles are not necessarily those of NASC. Requests for distribution changes should be directed to NASC, NAS Norfolk 11, Va. Att: Safety Education Dept., if you are receiving the magazine free because of military or commercial contract status with the Navy. . . . IF YOU ARE A PAID SUBSCRIBER, address all renewals and change of addresses to Superintendent of Documents, Washington 25, D. C. **Subscriptions:** Single copy 35 cents; 1-year subscriptions $3.50; 2 yrs., $7.00; 3 yrs., $10.50; $1.00 additional annually for foreign mailing. **Printing:** Issuance of this publication approved by the Secretary of the Navy on 15 April 1961. Library of Congress Catalog No. 57—60020.

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Do You Resist Progress?

Resistance to change is regrettably a somewhat normal human reaction. Do you tend to greet new and old **safe operating procedures** with the same attitude?

YOU don't think so? Well, don't be too sure. Human beings who don't resist progress are rare exceptions. The plain fact is that most of us do.

Progress is a wonderful thing as long as it involves somebody else. But when a new idea crops up in *your* situation, affecting *your* job, how do you react? Do you step forward eagerly to appraise its merits with an open mind? Or are you more apt to draw back—perhaps unconsciously—and reach for something to kill it?

Resistance to change is almost instinctive. Doing things differently would upset our comfortable habits of thoughts and action. It would create the need for thinking, planning and making new decisions. And what if those decisions happened to be wrong?

Change always involves risk—the risk of failure, the risk that things won't turn out as much to our liking as they are now. We're familiar with our present problems. But who knows what our problems would be if we started making changes?

Are you still confident you don't resist progress? Well, just for fun, check the following list of five expressions people use to kill progress, to avoid considering or trying new ideas.

It isn't in the budget

Maybe it isn't in the budget. But the budget represents yesterday's planning. If reasons are compelling enough, the budget can be—and should be—changed. The budget is not a straight jacket intended to freeze all thought and action.

It won't work in our department

Yes, if you want to search hard enough, you can find reasons—real or imagined—why your department is different. But are they reasons or merely excuses for lack of action?

We tried that before

Did you? Precisely this idea or merely something like it? And how was it executed? Don't be too sure that ideas that were tried and didn't work are bad ideas. Many a terrific idea has failed simply because it was poorly executed.

It's too radical a change

Sometimes a change is too radical to put into effect all at once. But other times a radical change is exactly what's needed. Anyone who calls a change too radical ought to have specific reasons to back up his opinion. Otherwise he's merely ducking.

We don't have the time

This is the favorite comment of people who've planned something and don't want their plans changed. If they really want to change things, it's amazing what can be accomplished in a very brief period.—*"What's New"*

A State Of Calm Satisfaction

Do you believe that experience is the best teacher? Accident reports and statistics reveal that some violations have been chargeable to the oldest and most experienced crews. Why? Complacency is defined as "a state of calm satisfaction". Surprisingly enough, complacency is caused by the very things that should prevent accidents . . . factors like experience, training and knowledge contribute to complacency. As experience accumulates, crews are more likely to become satisfied with their ability to handle any operational circumstances. Actions become easy and automatic. Complacency makes crews skip hurriedly through checklists, fail to monitor instruments closely or to utilize all navigational aids. It can cause a crew to use shortcuts and poor judgment, and to resort to other malpractices that mean the difference between hazardous performance and professional performance.

Adapted from "Combat Crew."